

PRICE \$1.00

Construction Methods AND EQUIPMENT

A MCGRAW-HILL PUBLICATION

DECEMBER, 1958



With beautiful, snow-covered Mt. Rainier as a backdrop, a husky bulldozer carves out a haul road for a lumber company's logging operations in Washington.

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Open 'er up!



"POWERSTEEL"

is more than the match
for today's most
powerful machines!

With today's bigger and more powerful construction equipment, you've got to keep it working at full capacity — no babying — minimum downtime — to show a profit.

So don't shortchange today's power with yesterday's wire rope! With "POWERSTEEL" you'll get trouble-free production from a wire rope designed for today's greater horsepower and bigger loads. It is 15% stronger than improved plow steel rope — more resistant to wear and abrasion — gives longer service life — requires fewer rope changes. Many "POWERSTEEL" users report as much as 100% longer rope service in comparison to ropes formerly used!

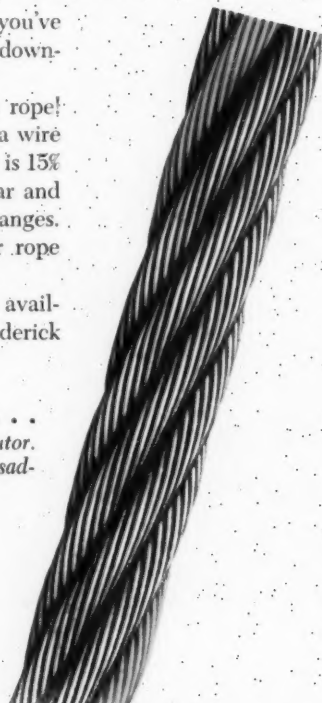
Yellow Strand "POWERSTEEL" is always nearby — always available — at your Broderick & Bascom Distributor. See him soon! Broderick & Bascom Rope Co., 4203 Union Blvd., St. Louis 15, Mo.



NEW! YELLOW STRAND WIRE ROPE CLIPS . . .

Ask for them at your Yellow Strand Wire Rope Distributor. Heavy-duty galvanized steel U-bolt. Drop-forged steel saddle, hot dip galvanized. Easily applied.

Yellow Strand **Wire Rope**



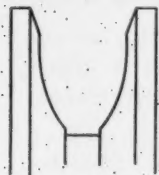
B.F. Goodrich

V belt briefs

TIPS ON THE CARE, MAINTENANCE AND SELECTION OF V BELTS FOR INDUSTRY

Worn sheaves can ruin belts fast

Be sure to check the pulley grooves when putting new belts on a drive. If the sidewall is worn, the sheave should be replaced.



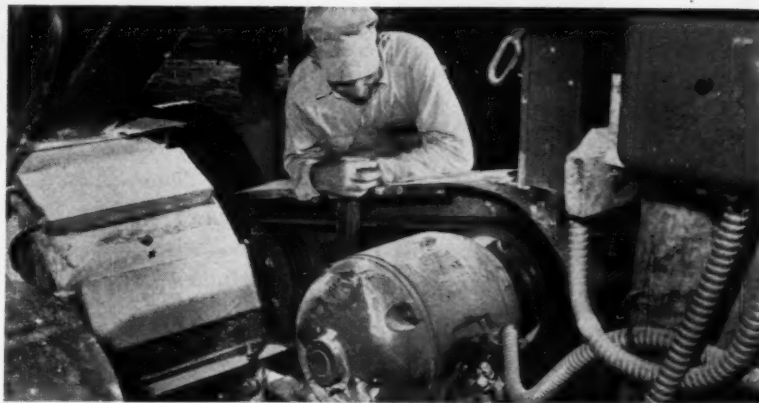
Worn sidewalls dish out (see illustration), form a "shoulder" at bottom of groove which chews off bottom edges of belt, ruins new belts in no time.

Even cast iron or steel sheaves will wear when subjected to abrasive dust. Rust is also an enemy of sheaves: Highly polished sheave sidewalls rust easily, gradually wear away as rust is polished off by belt action.

Don't play "snap the whip" with V belts



V belts that sag too much are snapped tight suddenly when the motor starts or when peak loads occur. That snapping action can actually break the belts, because this added stress is more than the belt was designed to take. Keeping belts at correct tension will prevent this "snap the whip" action.



STRONGER MUSCLES FOR AN IRON FIST—That machine, run by V belts, beats clay into fine dust for making bricks. But the heavy load, beat and dust caused belts to fall to pieces in two weeks. Rather than go to the expense of redesigning drive with more belts, they switched to B.F. Goodrich High Capacity V belts. These belts are so strong they've already lasted six months—10 times longer than the other belts—and still look good.

What caused this V belt failure?



Cause: Oil splashed or dripped on belt. Caused swelling, softened rubber.

Prevention: Use splash guards to protect drives. Where oil can't be avoided, switch to B.F. Goodrich High Capacity belts which are oil resistant.

Grommets make B.F. Goodrich belts stronger



B.F. Goodrich Grommet belts grip better, transmit more power

Why does a B.F. Goodrich Grommet belt, although more resilient, stretch less, grip better and transmit more power under full load than ordinary V belts? These sketches will explain.

At right is an ordinary V belt. Notice, there's little rubber between plies. Added stress of sudden jerks must be taken by cords. When belt distorts under load, center cords sag, leaving outer cords to do all the work. Dishing action causes belt to pull from sides of pulley groove, reduces gripping surface, cuts ability to transmit full power.



Ordinary belt



Grommet belt

In B.F. Goodrich Grommet V belt (at left), cushioning of rubber surrounding grommet absorbs much of added stress when belt is jerked. Even when belt is distorted under full load, cords of grommet continue to carry a full share of load. Belt does not pull away from groove wall, maintains gripping surface, transmits full power.

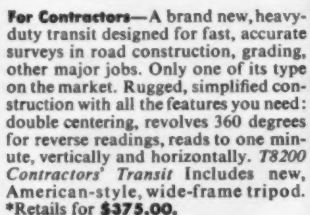
Grommets are two extra strong cord loops inside B.F. Goodrich V belts. They're like twisted cables, except they are endless. There are no splices or overlaps in this cord loop—no weak spots to cause premature failure. Since the section where the cords overlap in ordinary V belts is where 80% of the failures occur, this cause of failure is eliminated in B.F. Goodrich Grommet belts.

Ask a factory-trained specialist

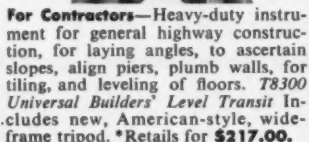
For help in selecting V belts for any kind of service, call the man who is a specialist in V belts—your B.F. Goodrich distributor. He can help you cut costs by getting longer life from your V belt drives. B.F. Goodrich Industrial Products Co., Dept. M-473, Akron 18, Ohio.

B.F. Goodrich v belts

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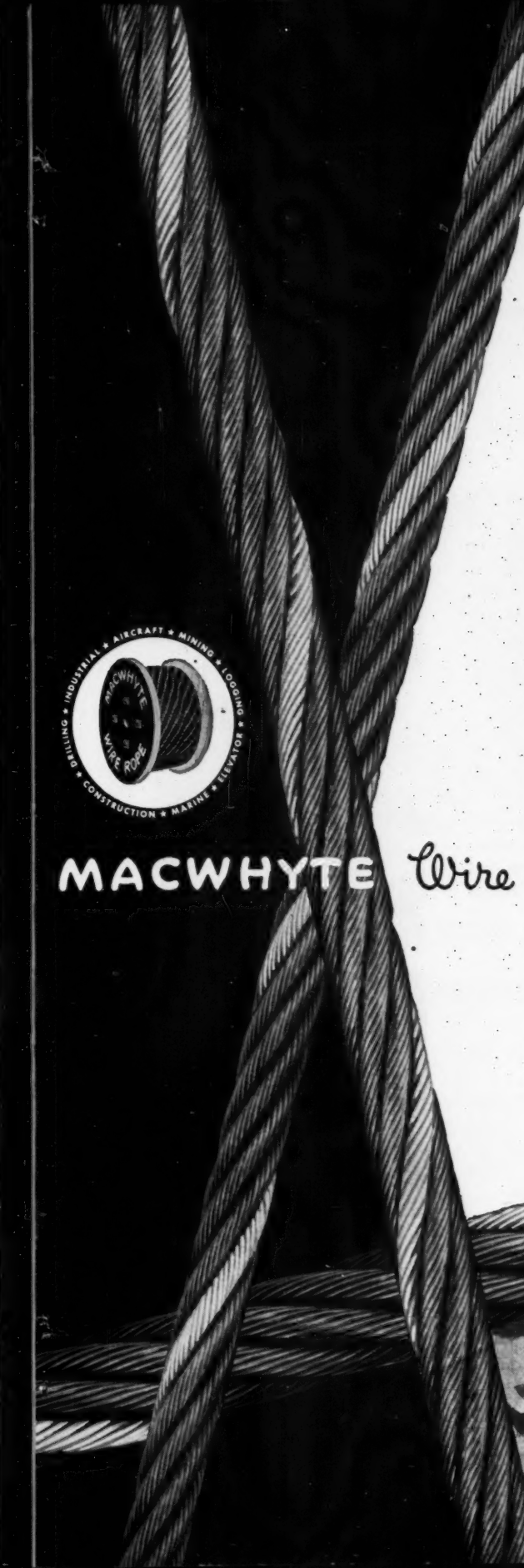
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You can lengthen the service life — and lower the yearly cost — of your wire ropes by using the *correct* Whyte Strand Wire Rope for each piece of equipment.

What do we mean by correct? Well — all wire rope isn't alike. The demands of dragline service are different from those on scrapers or shovels. But whatever the requirements — no matter how tough the job — there's a Whyte Strand Rope specially designed to withstand the particular abuses of *each* kind of service. What's more, we'll be glad to recommend which of Macwhyte's thousand-and-one ropes is the *best* for *your* kind of job.

All Whyte Strand ropes are internally lubricated by a special process which individually coats every wire . . . every strand . . . with a tough, tenacious lubricant coating. This increases the rope's flexibility, reduces internal wear, and provides excellent corrosion resistance.

Ask your Macwhyte distributor for help in getting maximum service life from your wire rope. He'll be glad to give you a correct rope recommendation for each rope on every piece of your equipment. Don't guess when you can be sure. Call him today!

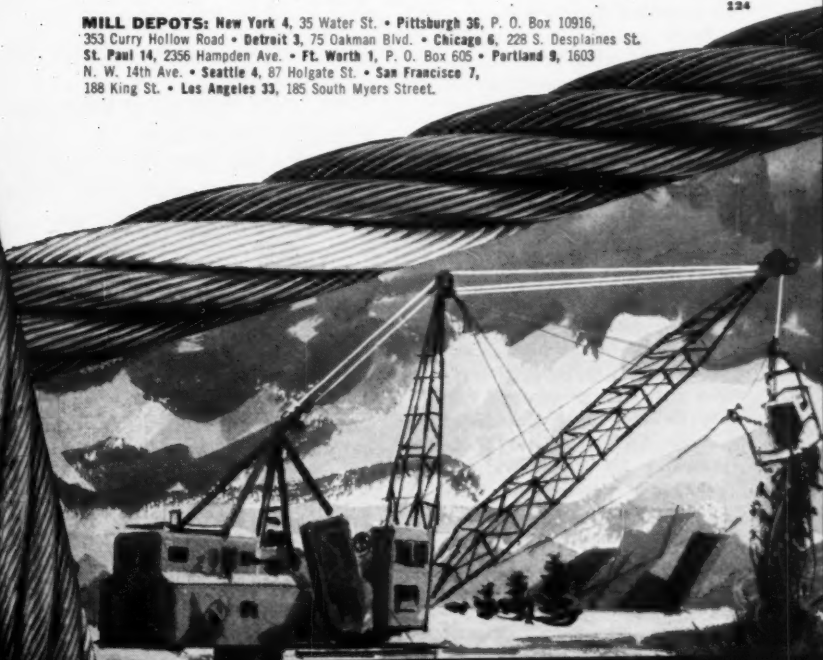


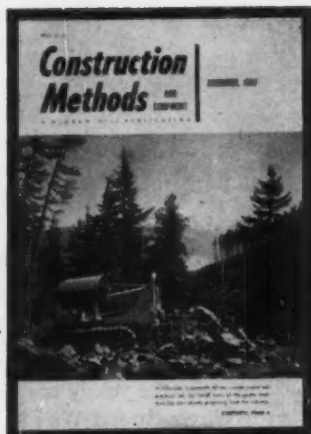
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DECEMBER, 1958

Pay Dirt in This Issue

ON THE COVER

Brewer & Rae, contractors from Orting, Wash., have been building logging roads for St. Paul & Tacoma Timber Co. for more than 13 years. During that time, using dozers such as the Allis-Chalmers HD-21, they have completed more than 200 mile of 20-ft rock and gravel forest-service roads in the steep and rugged country north and west of Mt. Rainier.

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NEXT MONTH

Four big contractors have almost identical contracts on four Air Force bases in Michigan. Each contract runs to about \$10 million and calls for enlarging runway facilities to handle heavier aircraft. Each contractor is approaching his job in his own way; the four jobs provide some interesting comparisons of earth-moving techniques.

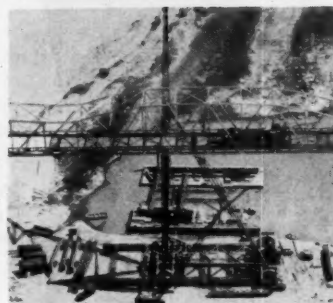
Standard Panels Form Curved Thin-Shell Roof . 60

Six thin-shell hyperbolic paraboloids, each 60 ft square, roof a college building. They look hard to form, but the contractor did the job with standard plywood panels.



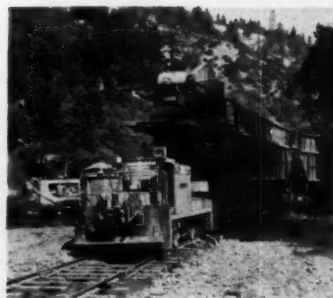
Traveling Stiffleg Sets High Bridge Steel . 66

Instead of using overhead travelers to erect steel, contractor works from the ground with huge stiffleg that handles 200 tons at a 100-ft radius with its 200-ft main boom.



Big Rigs Boost Production on Tunnel Job 82

Muck trains made up of three huge interconnected rail cars haul 150 yd of muck a trip from two tunnels being driven as part of the vast Feather River Project in California.



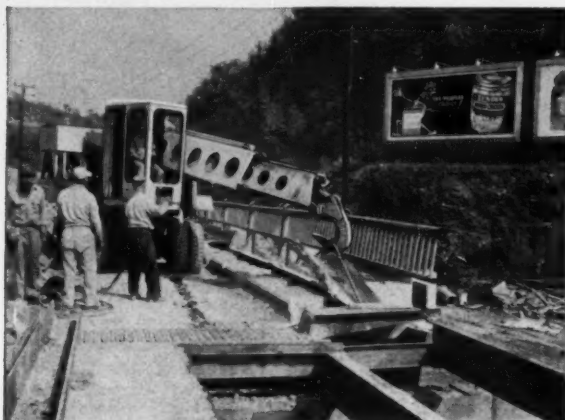
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Gradall, with Vulcan 100 Piledriver, breaks concrete to expose reinforcing rods.



Gradall holding concrete in position while a reinforcing rod is cut.



After snaking the concrete from under guard rail, Gradall lifts slab from deck.



Holding freed concrete, the Gradall loads into trucks or moves to end of bridge to deposit load.

"You can do more with a GRADALL than any other piece of equipment" says *Louis Wescott Construction Co.*

GRADALL CUTS COSTS ON ALL THESE JOBS!

- Digging gutter and drainage ditches
- Structure excavations—headwall, stilling basins, etc.
- Trenching for under drain and large drains
- Placing concrete culvert and drainage pipe
- Backfilling
- Sloping and grading
- Rip-rapping
- Pulling concrete forms
- Loading out and spreading top soil
- "Hand finish" jobs

TO HELP in widening Route 22, connecting Pittsburgh's Interbelt Freeway to the Pennsylvania Turnpike, Gradall was called upon for the difficult task of removing bridge deck, digging footers, stripping forms and many other jobs.

Also in the words of company President Louis Wescott, project subcontractor, "The Gradall is the most adaptable piece of machinery I own. My trencher, backhoe and high lift are all excavators, but they are

specialized. The Gradall will do all the jobs they can do *and more.*"

Gradall, with its five arm-action movements, is ideally suited for work that often proves too difficult for ordinary excavating machinery. Contact your nearest Gradall Distributor for an obligation-free demonstration.

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CARRIES A SIX-MAN CREW IN ALL-WEATHER COMFORT!

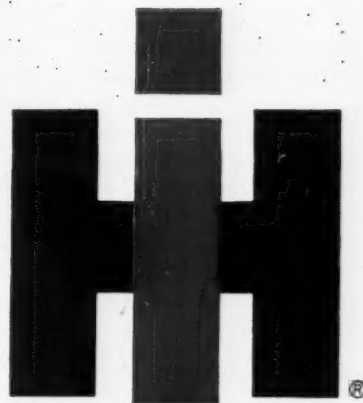
**INTERNATIONAL Trucks
with Travel-Crew Cabs
carry men and materials to the job
site in one operation. It's
always fair weather inside the cab
no matter how foul it is outside.**

Versatile INTERNATIONAL Trucks with six-man Travel-Crew Cabs have third door access to rear seat for easy in and out. Both back and front seats are over 5-ft. wide for maximum driver and passenger comfort. Rugged INTERNATIONAL chassis and cab are factory matched and warranted . . . sold at one low complete unit price. Compact-design and conventional models including 6-wheel models with GVW ratings to 33,000 lbs. See your INTERNATIONAL Truck Dealer, today!

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Here's the all-purpose four-wheel-drive INTERNATIONAL Travelall. Take it anywhere on any construction job—you'll find a dozen new uses for it every day. The weather-tight Travelall has more loadspace than other wagons. It carries 8 husky construction workers or a full load of tools and equipment fully weather-protected all day. On or off the road the Travelall has plenty of power and traction. Its accurate, positive steering and road-hugging qualities makes all driving easier and safer. See and drive a four-wheel-drive Travelall soon.



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Motor Trucks • Crawler Tractors
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TRUCKS cost least to own!



Installing Bethlehem rock bolts in tunnel roof. General Contractors and Engineers: James McHugh Construction Co.

Wedge-Type Bolts Support Roof of Buffalo Sewer Tunnel

A new storm relief sewer in Buffalo, N. Y., provides additional protection for property in a semi-business area. The horseshoe-shaped tunnel, authorized by the Buffalo Sewer Authority, was bored through solid Onondaga limestone. It is approximately 9 ft in diameter, and about 6800 ft long. Bethlehem slotted rock bolts were used in the tunnel roof, to provide firm support.

BOLTS LOCK ROCK SLABS TIGHTLY

Bethlehem rock bolts are ideal for supporting tunnel roofs because they

lock together stratified rock slabs. They are strong, easy to install, and provide an extra margin of safety.

The 1-in. diam slotted bolts, threaded at one end, have a forged slot at the opposite end, which accommodates a steel wedge. The bolts are inserted wedge-first into drilled holes. When the back of the hole is reached, the wedge drives deep, spreading the bolt ends so that they anchor in the hole.

Bethlehem also produces $\frac{5}{8}$ -in. and $\frac{3}{4}$ -in. diam headed rock bolts, used with an expansion shell and a

steel plug. When this bolt is tightened, the plug is drawn down on the threads, expanding the serrated leaves of the shell.

If you have any question about the use of Bethlehem rock bolts, or rock bolt accessories, all you need do is get in touch with the nearest Bethlehem sales office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

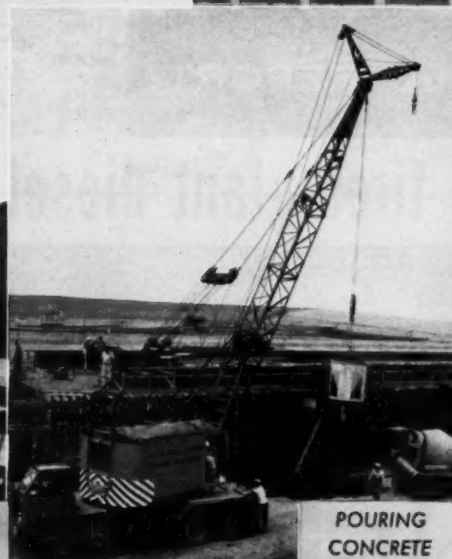
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL





HANDLING
STEEL



POURING
CONCRETE



CLAMSHELL
WORK

NORTHWEST TRUCK CRANES

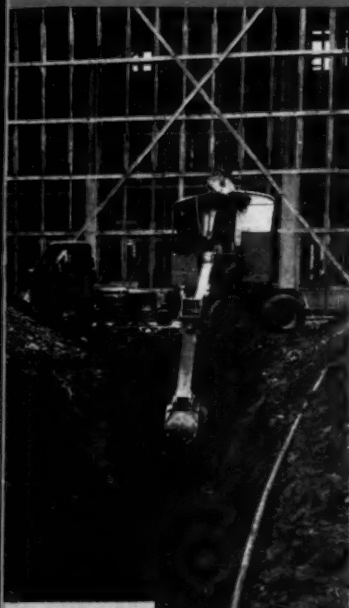
Money Makers on jobs like these!

● Northwest Truck Cranes bring you the greatest combination of advantages ever put on rubber. They mean time saved and money made on jobs like those illustrated. Northwest Truck Cranes, like all Northwests, are always ready to go. *We hear it everywhere and Northwest owners will tell you so.*

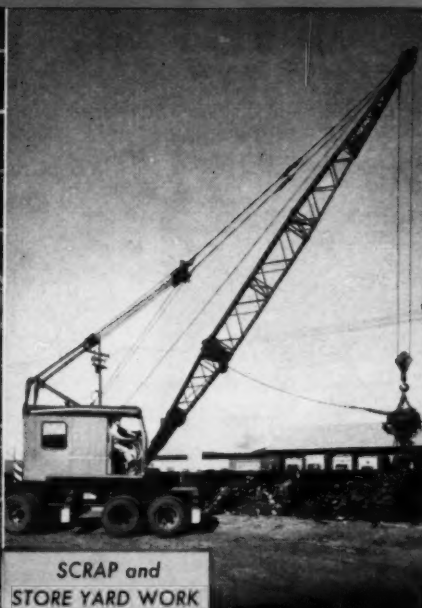
Their greater flexibility, their smooth operation with long booms, their greater dependability reduces time losses and speeds the job over ordinary equipment.

You can't know all about a Northwest unless you have had one. Bring yourself up to date on Northwests newer features. Ask to see a Northwest Man.

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1503 Field Building, 135 South La Salle Street
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PULLSHOVEL
WORK



SCRAP and
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CRANES
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Capacity

PULLSHOVELS
¾ Yd. to 2½ Yd.
Capacity

TRUCK CRANES
25-Ton and 35-Ton
Capacity

ENGINEER'S FIELD REPORT

PRODUCT **CHEVRON PRESSURE PRIMER SYSTEM**
FIRM **JONES-TOMKINS CO.**
Cougar, Washington

Special cartridge fires giant diesel in seconds



At world's highest earth-filled dam construction site near Woodland, Washington, three giant diesel shovels get immediate starts from Chevron Pressure Primer System, reports Jones-Tomkins, general contractors. System helps speed shovel's fill-borrowing operations for this \$51,000,000 project.

Five-year-old 4500 Manitowoc Speed Crane (above), powered by Caterpillar 350 h.p. V-12 D397 engine, operates 18 hours a day, six days a week, loading 21-yard dump trucks in just 70 seconds. Jones-Tomkins uses Standard fuels and lubricants exclusively on this job.



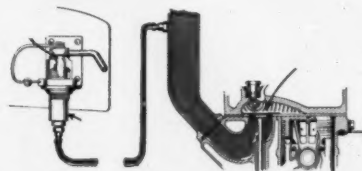
Chevron Pressure Primer Discharger mounted on instrument panel (left) operates satisfactorily despite heavy vibration, reports shovel foreman Henry Watson (right). "We've had absolutely no trouble with this system. The Chevron Pressure Primer System eliminates dust clogging and allows fluid to reach the cylinders quickly. It's the practical way we've found to get these rigs going."



TRADEMARKS "CHEVRON" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey

Why Chevron Pressure Primer System assures fast starts



- Volatile Chevron Priming Fuel atomizes in induction system at all temperatures even at -65°F, no hand-pumping required.
- Pressure or weakest spark from engine fires mixture.
- Simple rugged air-tight discharger prevents Priming Fuel leakage.
- Small, fireproof, pressurized steel cartridges protect Priming Fuel from water and dirt.

For More Information or the name of your nearest distributor, write or call any of the companies listed.

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado

Construction News From Washington

Washington, D.C.
December, 1958

Congress Will Write the Ticket

Congress will be on construction's side in the battle of the budget that begins next month. President Eisenhower has called for spending cuts in every department of the government. But the 86th Congress that convenes in January won't accept cutbacks in federal construction programs.

The new Congress, in fact, plans to write its own construction ticket.

Last month's elections give it the power to do just that. Congressional leaders apparently can count on big enough majorities to enact controversial construction measures—airports, aid for depressed areas, and housing—that were stopped by Presidential vetoes last year.

Similar majorities will be on tap to avert any slowdowns the Administration may propose for other construction programs. Congress has the votes to assure continuance of flood-control, river and harbor, reclamation, highway, hospital, sewage plant, and other construction programs at current, or even higher, levels.

A Boost for Building Construction

Democrats won't lose any time in salvaging the big programs that went down with the omnibus housing bill late in the last session. You can look for big sums to revitalize the urban renewal and college housing programs, which have been marking time since June. Cities will probably get \$500 million or so of capital grants for urban redevelopment in the first year of a long-range program. And colleges can expect several hundred million for low-interest housing loans.

Public housing is a good bet to come through with an authorization of some 35,000 units per year. Added together, the expected actions on these big programs will mean several billion dollars of large building construction in future years.

Congress holds the whip hand on housing. The Administration has run out of FHA mortgage insurance authority and must have a quick increase to avoid a possible downturn in new home construction. Congress will vote all the insurance authority needed, plus another prop that the Administration doesn't want—more authority for Fanny Mae to purchase FHA and VA mortgages on new houses. This device gave home building a needed boost last spring and summer.

No Cut in Highway Work

Congress won't tolerate any cut in the higher rate of spending voted last year for the Interstate Highway System. But it faces the crucial

question of determining how to finance the increased expenditures—whether by increasing user taxes to put the highway program back on a pay-as-you-go basis or by drawing on general revenues to make up the deficit in the Highway Trust Fund.

State highway departments already have their federal allocations for fiscal 1960, starting July 1, and they know what they will get for fiscal 1961.

Steady Water Resource Development

Water development projects of the Army Engineers and the Reclamation Bureau can be expected to get \$1 billion again in next year's appropriations.

But Congress may not vote starting funds for as many new projects as it did this year, when it initiated 64 over the objections of the President, who wanted no new starts. A good part of next year's appropriation will go for continuing work on these new projects, which will cost eventually more than \$600 million to complete.

Prospects for Other Types of Construction

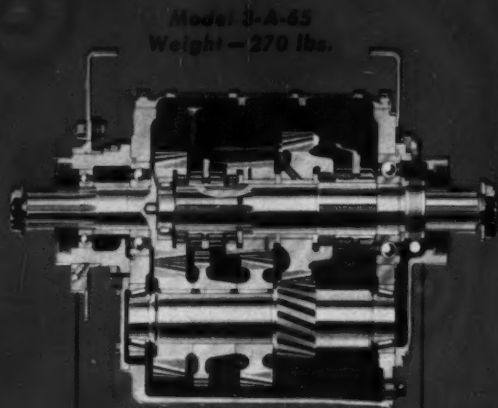
AIRPORTS—Balked by a veto at the last session, Democrats will try again to push through a bill to extend and increase federal aid for airport construction. The new legislation will at least equal the vetoed proposal—a five-year program with \$100 million of matching funds each year.

DEPRESSED AREAS—Aid to depressed areas also will be up for another try, this time presumably with enough support to obviate a second veto. The 1958 legislation proposed \$75 million in grants and \$100 million in loans to promote stability in employment.

MILITARY—High priority requirements for missile programs and strategic bomber dispersal prevent any cuts in the current military construction program of \$1.75 billion to \$2 billion a year. Congress will approve new projects and money to meet Defense Department needs. About 75% of the expenditures will be for construction projects in the United States.

WASTE TREATMENT—Federal grants for construction of waste treatment plants, now authorized at \$50 million a year, may be boosted to \$100 million by the new Congress. A bill to authorize the increase came along too late for action in the last session.

POWER—TVA will get bond-issuing authority to finance the generating plants that it needs to serve its territory. And Congress will back the Democratic plan for a bigger atomic power program, with more federal money for construction of demonstration plants.

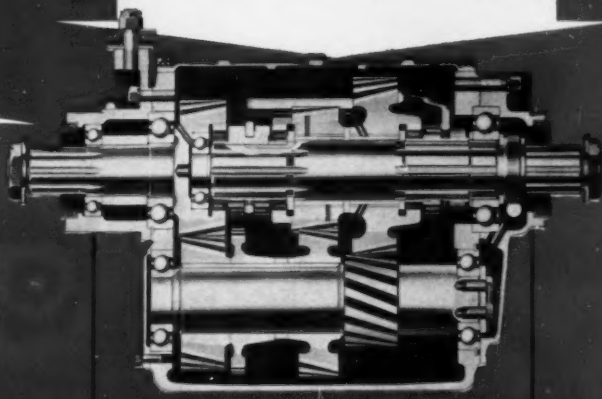


65 Series (Medium-Heavy-Duty)

MODEL	RATIOS		
	High	Medium	Low
3-A-65	.754	1.00	2.221
3-B-65	.804	1.00	1.239
3-C-65	.754	1.00	1.239
3-D-65	.804	1.00	2.221
3-E-65	.804	1.00	1.74
3-F-65	.754	1.00	1.74
3-G-65	1.00	1.32	2.221
3-H-65	1.00	1.32	1.74

92 Series (Heavy-Duty)

MODEL	RATIOS		
	High	Medium	Low
3-A-92	.75	1.00	2.09
3-B-92	.84	1.00	1.24
3-C-92	.73	1.00	2.64
3-D-92	.75	1.00	1.24
3-E-92	.84	1.00	2.09
3-F-92	.84	1.00	2.64
3-G-92	1.00	1.327	2.09
3-H-92	1.00	1.327	2.64



Model 3-A-92 - Weight - 350 lbs.

22 1/2"

Now ...the most complete line of 3-speed AUXILIARY Transmissions

The Fuller Manufacturing Company now offers the most complete line of three-speed auxiliary transmissions . . . for transport, logging, construction, mining and crane carrier services . . . at lower prices than competitive units in a comparative capacity range.

The extremely rugged heavy-duty 92 Series has been completed by the addition of 5 new sets of gear ratios, Models 3-D-92 through 3-H-92. Four new sets of gear ratios, Models 3-E-65 through 3-H-65 have been added to the medium heavy-duty 65 Series.

Split Gears and GO

The expanded line of three-speed

auxiliary units includes splitting ratios, both underdrive and overdrive. With these splitting ratios, the engine can operate at maximum horsepower through a full range of vehicle speeds. Ideal for over-highway operation, the extra gears allow faster schedules, greater profits.

Deep Reductions

Deep reductions, in combination with splitting ratios, offer maximum flexibility both on and off-highway where the deep reduction is required for extreme grades and soft footing, and where splitting efficiency is required for traffic conditions.

Longer Equipment Life

With engines working in the most efficient torque and horse-power range, there is less lugging . . . less wear . . . and greater fuel economy. Result: lower maintenance costs, less downtime, longer engine and transmission life.



FULLER MANUFACTURING CO. Transmission Division • Kalamazoo, Mich.
Subsidiary, Eaton Manufacturing Company

SECOND LARGEST DAM IN THE U. S., at Glen Canyon, Ariz., will incorporate two of these 2,800 ft. diversion tunnels. Frazier-Davis equipment runs dependably, stays on the job, thanks to the Texaco Simplified Lubrication Plan.



Glen Canyon tunnel borings nearing completion with Texaco Plan



**Only 6 lubes needed to keep
Frazier-Davis equipment
working dependably**

This is Frazier-Davis Construction Company's job: to bore the east side diversion and service tunnels, with a combined length of 2½ miles, through the walls of Arizona's Glen Canyon. It's a vital project, part of the Bureau of Reclamation's \$760 million development of 10,000 square miles of arid land. On a job as big as the Glen Canyon Dam, on-time completion of every phase is absolutely essential. And that puts a priority on dependable equipment performance.

The Texaco Plan keeps equipment on the job—at lowest cost—by handling all major lubricating problems with no more than six products. A combination of specialized and multi-purpose lubricants assures proper lubrication for each machine, with lower lubricant inventory and less

chance for mistakes. For Frazier-Davis, the Texaco Simplified Lubrication Plan has proved to be one of the most economical and dependable ways to get top performance from every piece of equipment.

Here are the lubricants Texaco recommended for Frazier-Davis:

Texaco Ursa Oil Heavy Duty—keeps engines clean, rings free, valves properly seated for full power.

Texaco Regal Oil R&O—prevents formation of rust and harmful deposits in compressor systems.

Texaco Universal Gear Lubricant EP—keeps differentials and transmissions running smoothly at low cost.



Bureau of Reclamation photos

Texaco Marfak Multi-Purpose 2—protects wheel bearings, chassis, water pumps against dust, moisture and wear.

Texaco Track Roll Lubricant—prolongs the life of crawler mechanisms.

Texaco Rock Drill Lubricant—guards against wear and rust whether drills are running or idle.

Ask a Texaco Lubrication Engineer to help you simplify your lubrication problems and reduce costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48

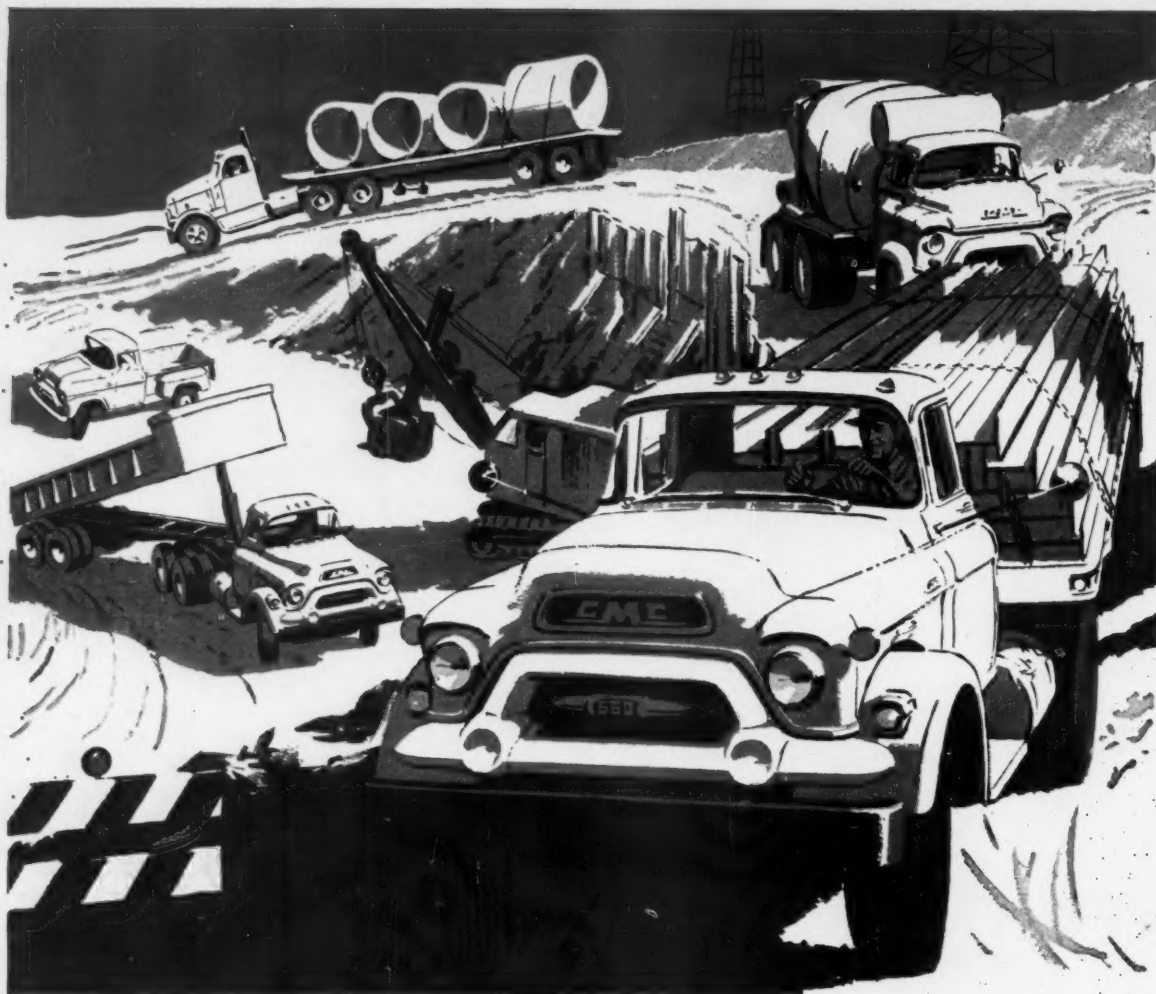
States; or write:

The Texas Company, 135 East 42nd Street,
New York 17, N. Y.



LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

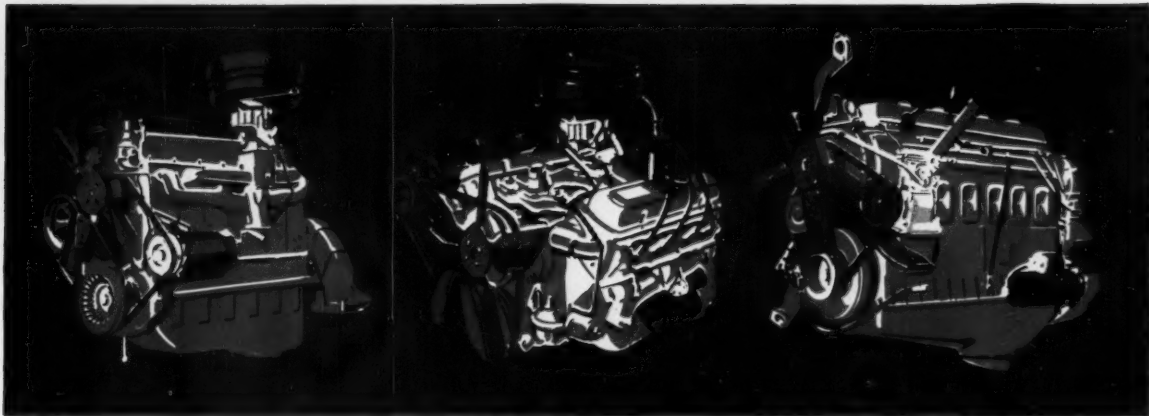
(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)



GMC is on the move with OPERATION "HIGH GEAR"

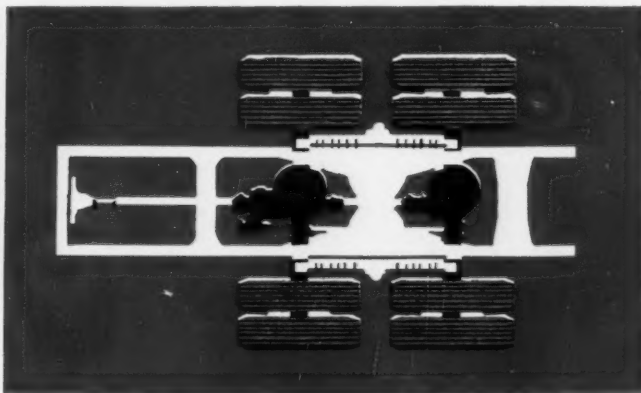
GMC is really rolling with the biggest engineering, design and quality-control program the industry has ever known! You can see the results in today's GMC Trucks—toughest, most dependable, most economical trucks ever built!

Biggest selection of Six-Wheelers in the industry. Widest choice of specification combinations ever offered—engines, axles, tandems, wheelbases, GVW's, GCW's. Stripaway COE cabs offering easy access never known in cab-over-engine design. Best diesel service from coast-to-coast, GM trained. Largest selection of truck-built pickups. There's almost no end to the big advances at GMC due to Operation "High Gear"! Call your GMC dealer and discover how this powerful new program can pay off big for you. GMC Truck & Coach—a General Motors Division.



**HIGH-TORQUE 6's,
V-8's AND DIESELS
TO CHOOSE FROM**

You have the finest selection of top-efficiency gasoline and diesel engines—all designed to get maximum payload there on time with less engine wear and tear. For example, a GMC pickup with standard 3.07 fast ratio cruising axle runs at 623 revolutions less per mile. It provides overdrive performance at no extra cost—yet gets there just as fast with far less strain on valves, pistons and bearings.



TOUGH, YET LIGHT, FRONT AND REAR AXLES PERMIT BIGGER PAYLOADS

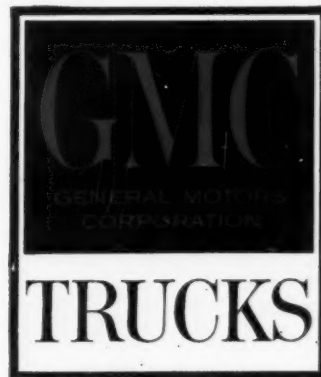
GMC front axles are designed to let you turn in a shorter radius. Built stronger, too, they have one-piece center beams of heat-treated steel and extra thickness at points of stress.

Available on tandems where light weight is a must, aluminum saddles and walking beams, and rubber-cushion suspension cut down weight while maintaining GMC ruggedness.



HAULS OVER 16% MORE READY MIX ON EVERY TRIP

Tailored to ready-mix needs, this GMC FW556 pacesetter out-hauls anything on the road... carries 7 full yards at a clip within a 46,200 lb. total! On 1,000 cubic yard jobs it saves up to 24 trips! Powered by a mighty 370 cubic inch V-8 engine.



From ½-ton to 45-ton
... General Motors
leads the way!



**DON'T BE AFRAID
TO BID A
WET
JOB**

Contractors on three sections: Columbia Construction Co., Thompson Construction Co.,
Tousley Construction Co., Inc. — all Indianapolis

Photo shows one of the three sections of Lick Creek Sewer in Indianapolis, Indiana, where Moretrench Wellpoint equipment enabled the contractors to overcome threatening water levels and to place 50,000' of pipe in a bone dry trench.

Water levels on the entire project varied from 15' to 22' in constantly changing

soil ranging from all sand and gravel to stratified clay and gravel in a hard clay bottom.

Careful installation and expert supervision on this work guaranteed results — gave each contractor freedom to excavate as he saw fit and to progress as rapidly as possible with economy and safety.

Don't be afraid to bid a wet job . . .

With MORETRENCH insurance you can't lose!
Ask for our help on any type project — large or small.

CATALOG ON REQUEST

**MORETRENCH
CORPORATION**

90 West St.
New York 6
CO 7-2283

4900 S. Austin Ave.
Chicago 38, Illinois
Portsmouth 7-4212

7701 Interbay Blvd.
Tampa 9, Florida
Tampa 61-1881

315 W. 25th St.
Houston 8, Texas
Underwood 4-7774

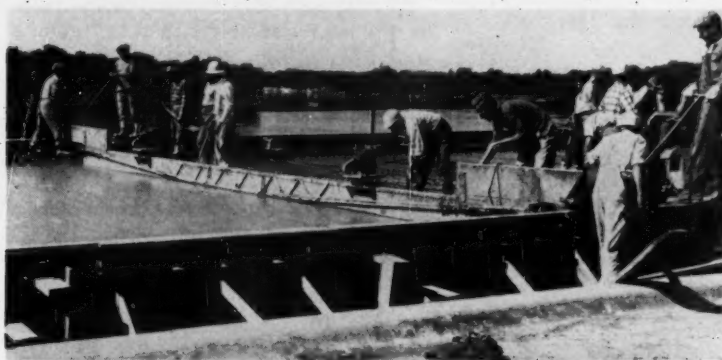
Rockaway
New Jersey
Oakwood 7-2100

Western Representative: Andrews Machinery of Washington, Inc., Seattle 4, Washington

Canadian Representative: Geo. W. CROTHERS Limited, Toronto, Ontario

Brazilian Representative: Oscar Taves & Co., Ltd., Rio de Janeiro

Job Talk ...



Long Screed for Wide Slab

Bridges on the North-South Expressway, now under construction north of Montreal, Canada, call for monolithic concrete deck slabs 38-ft wide. To strike off the full width of the deck in one operation, Ferrer Construction Co. had to order special underslung screeds that travel on rails placed along the parapets, 11½ in. above the concrete surface. The two 46-ft-long screeds that Stow Manufacturing Co., of Binghamton, N. Y., provided for the job are the longest they ever made.

The screed beams are made up

of Douglas Fir reinforced top and bottom by steel channels. Reinforcing bars welded to the channels, together with tie rods that run along the length of the beam, stiffen the screed to prevent sag. Two vibrators are mounted on the beam.

Ferrer kept at least 15 ft ahead of the screed when placing concrete. Three men—one at each end and one in the middle—move the screed along the rails by pulling on ropes. The screed vibrates the concrete and strikes it off true to grade at the same time:



Tractor Shovel Pours Concrete

When heavy rains made the only access to the site a morass of mud, contractor W. A. Sheets & Sons, Inc., of Fort Wayne, Ind., converted a tractor shovel into a concrete carrier to pour footings for a new school building.

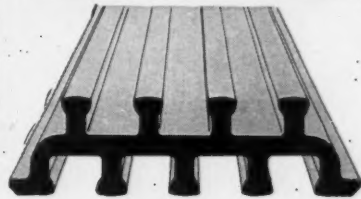
Sheets fitted a sheet metal hopper into the bucket of an Allis-Chalmers HD-6G tractor shovel

to transport concrete from transit mix trucks across the mud to the foundation excavation. A hand-operated gate controls pouring of the concrete from the 12x12-in. discharge chute. The tractor operator helped in dumping the load by tilting the bucket forward.

The tractor easily negotiated the 400-ft strip of mud cutting

LABYRINTH WATERSTOPS

A SOUND INVESTMENT
FOR CONCRETE CONSTRUCTION!



LABYRINTH AVAILABLE IN 2, 3 or 4 rib.

ON YOUR CONSTRUCTION:

1. Consider the investment in design, materials and labor (to mention a few).
2. Then consider how important safe, secure *watertight* concrete joints are.
3. Thorough watertightness *can* be secured by installing Labyrinth Waterstops—a dividend that makes the low initial cost of the product insignificant when compared to your total investment—and one that insures watertight concrete joints for years!

- Corrugated ribs grip concrete, insure an everlasting bond between joints.
- Finest polyvinyl plastic resists chemical action, aging, severe weather.
- Takes just seconds to nail to form ... easy to cut and splice on location (prefabricated fittings available).
- There's a Water Seal product for every type of concrete work!

If your aim is to stop water seepage, stop it effectively with Water Seals' Waterstops!

"See Us in SWEET'S"

New Literature and Free Samples Sent on Request—Use Coupon Below

WATER SEALS, inc.

9 SOUTH CLINTON STREET, CHICAGO 6, ILL.

Made in Canada for J. E. Goodman Sales, Ltd.
Toronto, Ontario

WATER SEALS, INC. DEPT. 2

9 S. Clinton Street
Chicago 6, Illinois

Please send free sample and descriptive literature.

Name

Company

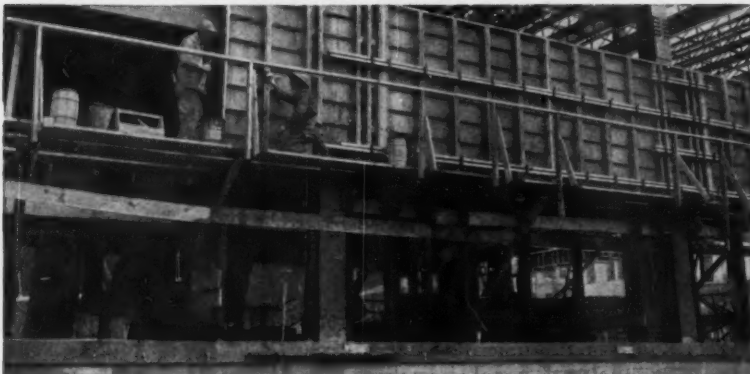
Address

City Zone State

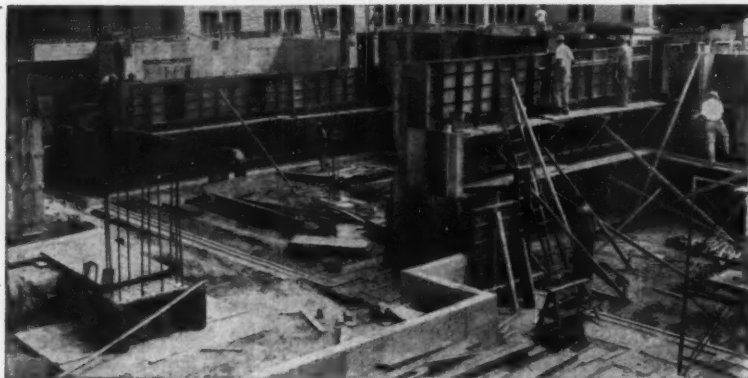
GENERAL BUILDING with Symons Forms



School Addition ... 12,000 square feet of Symons High Strength Forms were used for a total of 225,000 square feet of wall forming.



Insurance Building ... Symons Standard Forms were used to frame 56,000 square feet of Spandrel Beams. Symons Shores used throughout in beam construction.



Church ... About 30,000 square feet of forming was completed with Symons Forms. Wall thicknesses varied from 12" to 20" and in heights from 4 to 14 feet.

Symons can help you with your forming problems. Our engineers prepare complete form layouts and bill of materials at no obligation. Other Symons products used in general building are column clamps and shores. Forms, shores and column clamps may be rented with purchase option—rentals to apply on purchase price. Information on Symons products and services sent FREE on request.

 **Symons CLAMP AND MFG. CO.**

4255 Diversey Avenue

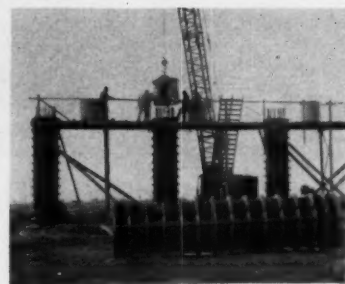
Dept. M-8

Chicago 39, Illinois

MORE SAVINGS FROM SYMONS

JOB TALK ... continued

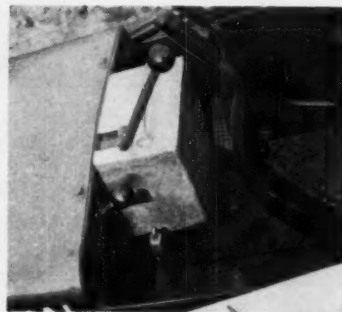
off the site. The contractor placed 17 cu yd of concrete in the footing forms in less than three hours with the rig, which can readily be changed back to its conventional role simply by removing four bolts attaching the hopper to the bucket.



Column Forms Take Abuse

Masonite-lined column forms framed with round yokes stand up to rough handling and stay in shape for many reuses. M. J. Boyle Co. built the forms for a bridge job on the Tri-State Toll Road near Bellwood, Ill.

Held together by 1¼-in. Signode steel strapping wrapped around the yokes, the column forms are 18 ft long and hold about 6 yd of concrete. Columns on this job are 3½-ft in diameter. Workmen roll the forms to the next pour and set them up in 40 min. The sturdy forms have already been reused six times.



Box Locks Control

A sheet metal box that slips over the ignition switch of an International TD-9 crawler tractor owned by Colfax County, Neb., is an effective safeguard against anyone attempting to operate the machine when left unprotected on the job. A padlock latches the enclosure to the instrument panel.



One of the new low-cost Barber-Greene Batch Plants in operation. Available in both 1000 and 1500 lb. sizes, these new plants include many years-ahead features.

two new low-cost Barber-Greene Batch Plants with advanced big-plant features

Write for information on these two new profit-building batch plants.

Many advanced features in new low-cost batch plants

Incorporating job-proved advantages of the famous Barber-Greene Batch-Omatics, these two plants also have many new features, including:

- **New Batchometer Asphalt Metering System** automatically meters preset quantity of asphalt to pugmill for each batch.
- **Dyna-Mix Pugmill** for faster mixing, more uniform coating . . . long life, easy maintenance.
- **Quick, Easy Erection** with three-unit design: screen and bin section; weigh-hopper and pugmill section; base section. Tapered pins guide sections into place . . . automatically align all bolt holes.
- **3½ Deck Vibrating Screen**, with 40 sq. ft. of area, gives top capacity for each plant and for the full range of asphalt mixes . . . integral part of bin section for easier erection. Four bins are standard—not extra.
- **Optional Hydraulic Controls** for easier operation . . . relieve operator of manual exertion; easily converted in the field.
- **Hydraulically Operated Pugmill Discharge Gate** provides instant discharge of mix . . . eliminates segregation. No time wasted between batches.
- **Other Advantages Include:** easier maintenance; complete line of accessories, including fines system; combined overflow chutes; scavenger-dust system.

58-44-A

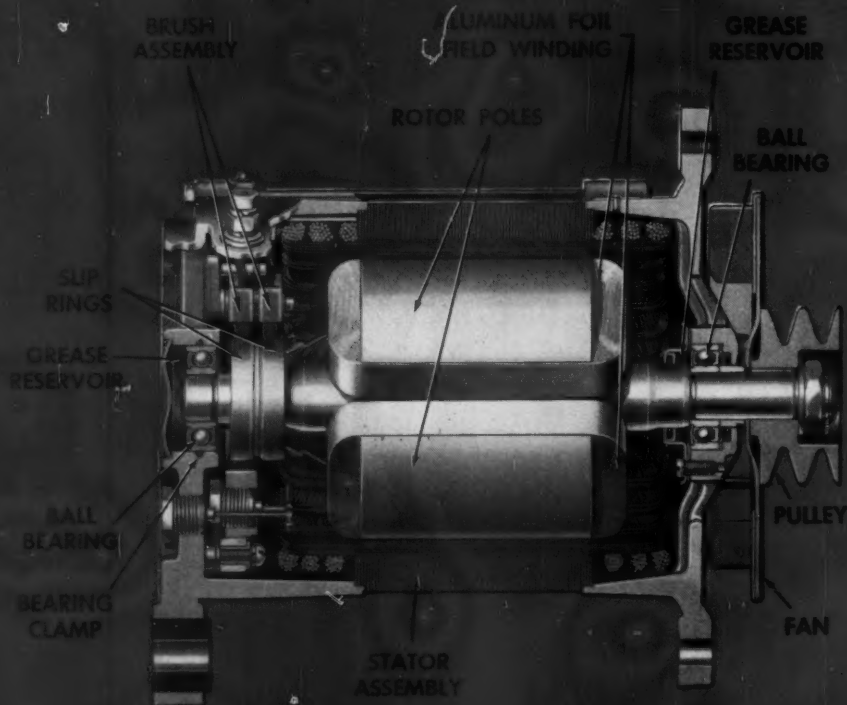
Barber-Greene

AURORA, ILLINOIS, U.S.A.



CONVEYORS...LOADERS...DITCHERS...ASPHALT PAVING EQUIPMENT

NOW! REAL CHARGE-AT-IDLE,

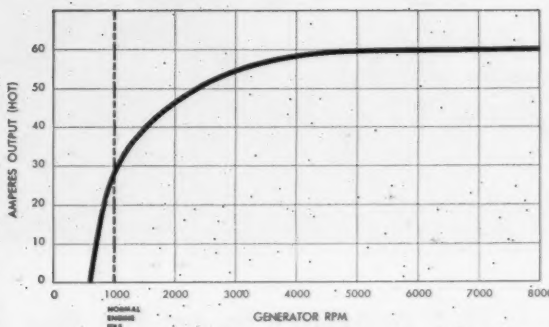
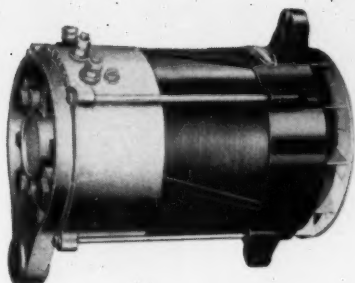


PROGRESSIVE
ENGINEERING
MAKES
THE
DIFFERENCE



UP TO TWICE THE TOTAL OUTPUT

**WHEN YOU REPLACE STANDARD D.C. EQUIPMENT WITH
DELCO-REMY'S NEW SELF-RECTIFYING A.C. GENERATOR**



Here's a completely new generator from Delco-Remy *specifically designed* to take care of cars and trucks with extra-heavy electrical loads under all traffic conditions . . . to increase battery life by eliminating deep cycling.

Designed to mount interchangeably with most standard d.c. generators, this compact new unit is only 5 $\frac{3}{4}$ " in diameter and weighs just 31 pounds. The a.c. design eliminates commutation problems, providing extra-long brush life . . . and the ball bearings are "lifetime" lubricated so that no attention is required between engine overhaul periods. Six specially developed silicon rectifiers built into the end frame eliminate the need for space-consuming external rectifier units, reducing installation time and cost to a minimum.

Be sure to specify this new self-rectifying a.c. generator along with its companion transistor regulator (either full or transistorized model) on your new special-duty equipment for 1959. This all-new power team is still another example of Delco-Remy progressive engineering at work for you.



GENERAL MOTORS LEADS THE WAY—STARTING WITH

Delco-Remy

ELECTRICAL SYSTEMS

DELCO-REMY

DIVISION OF GENERAL MOTORS

ANDERSON, INDIANA

SIX LANES...NINE MILES

-AND EIGHTEEN MONTHS



The pressure is on for the builders and their Cities Service Lubricants

Working against the clock, two of the Midwest's most respected construction companies have joined hands in the building of a nine mile segment of the new Illinois Toll Road outside of Chicago.

The two firms, M. J. Boyle & Co., and Ryan Construction, are contractors for the entire job—excavations, grading, building and paving—and they have eighteen months to do the job. Before it is completed, they will have moved 5,000,000 yards of earth and constructed fourteen bridges in addition to the actual six lanes of road.

Clearly, the pressure is on! And sharing that pressure are Cities Service fuels, oils and greases. For when M. J. Boyle and Ryan Construction decided to team up, it was obvious they would need to standardize their fuels and lubricants—and the selection of Cities Service high quality products seemed the logical choice.

And logical it was! For despite an especially bad winter and a torrid summer, despite round-the-clock operation in heavy rain, snow, and mud, there's never been a lubrication failure of any kind.

At right, you can see some of the many Cities Service products used in this project—and the special advantages they offer. But only a Cities Service Lubrication Engineer can tell you how they might apply to *your* operation. Have a talk with him. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.



More than one bridge per mile, some of them major construction jobs, are included in the nine-mile segment being built by M. J. Boyle & Co. and Ryan Construction. To meet their 18-month schedule, the two firms have pressed 1200 men, countless machines and Cities Service lubricants into round-the-clock service.

CITIES SERVICE
QUALITY PETROLEUM PRODUCTS

...FOURTEEN BRIDGES

TO FINISH THE JOB!



CITIES SERVICE PRODUCTS USED

WHY THEY USE THEM

C-500 Motor Oil

Excellent for diesels and gasoline engines in severest service. Extremely high detergency-dispersion.

Trojan H-2 Grease

New multi-purpose lubricant cuts inventory, reduces wear. Ideal for chassis, wheel bearings, water pump, etc. Better protection against mud and water.

Trojan Gear Oil

High-quality gear lubricant, blended from refined, high-viscosity index stocks. Contains oxidation inhibitor and anti-foam agent. Free-flowing, even at low temperatures.

DC-900 Oil

Ideal compressor lubricant. High viscosity index, superior anti-foam, anti-rust and anti-oxidation properties. Reduces deposit build-up.

Optimus 6 Steam Cylinder Oil

Unusually high-grade, filtered oil suited to pile drivers. One of many Cities Service steam cylinder oils.

Cities Service Diesel Fuel

Clean burning, for all diesel engines.

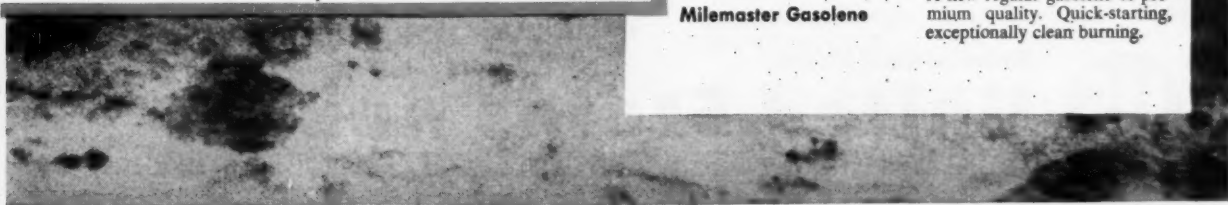
Milemaster Gasolene

A new regular gasolene of premium quality. Quick-starting, exceptionally clean burning.



Equipment is fueled and serviced where it stands, by roving Cities Service truck. Field service assures maximum use of machinery and minimum downtime. Equipment stays on job where it must remain to keep tight schedule.

Tough Grind: Forging through heavy mud, these trucks illustrate the conditions prevailing during round-the-clock construction. Plenty of factors to cause lubrication failure—but there hasn't been a single one, thanks to Cities Service heavy duty oils and greases.





4810 AIR HOSE



Where men and hose flex their muscles

Here's the hose that's as rugged as the men who use it. On the really tough construction jobs—where tight quarters, abrasive terrain and high working pressures take their toll of ordinary air hose—mandrel-made, wrapped-finish, U.S. 4810 Air Hose stands up to use and abuse.

Yet, despite its great strength, 4810 is no muscle-bound hose. "U.S." engineering has made it easier to



handle, readily flexible, able to take higher working pressures—and *less expensive*—than the conventional air hose you might be using. It's one of a complete line of U.S. Rubber construction hose.

When you think of rubber, think of your "U.S." Distributor. He's your best on-the-spot source of technical aid, quick delivery and quality industrial rubber products.



Mechanical Goods Division

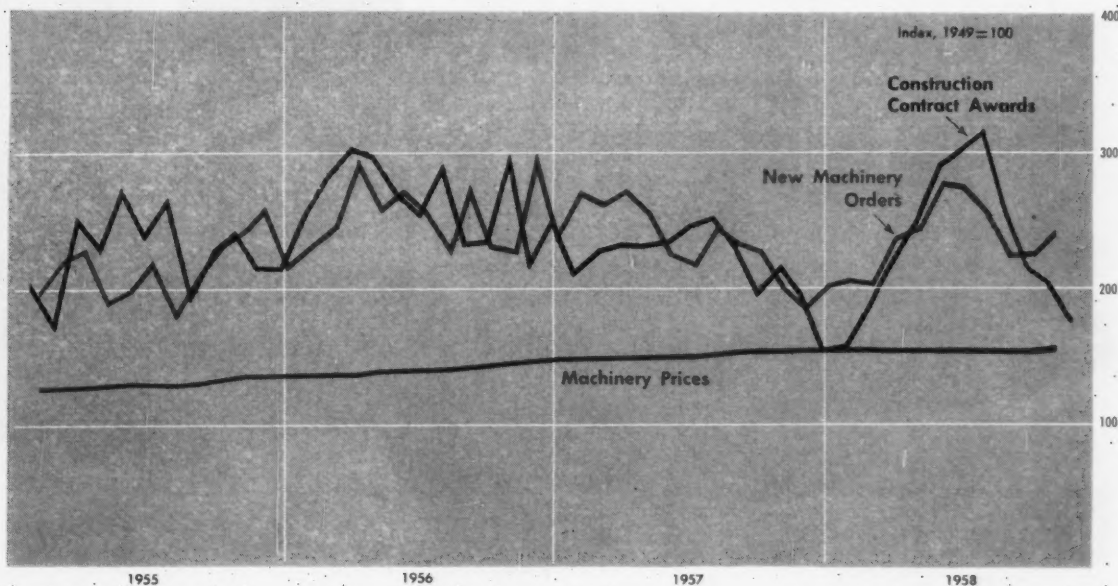
United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y.

In Canada: Dominion Rubber Company, Ltd.

Trends in the Machinery Market



Price Index

	OCT 1958	MONTH AGO	YEAR AGO	% CHANGE 1957-1958
All Types of Equipment	166.7	165.0*	164.9	+1.1
Cranes, Draglines, Shovels	165.5	165.5*	162.1	+2.1
Shovel, 1/2 cu yd	154.4	154.4*	153.7	+0.5
Shovel, 3/4 cu yd	170.3	170.3*	165.5	+2.9
Shovel, 1-1/2 cu yd	180.7	180.7	174.3	+3.7
Shovel, 2-1/2 cu yd	156.6	156.6	151.4	+3.4
Shovel, 3-3/2 cu yd	162.7	162.7	158.3	+2.8
Shovel, 6 cu yd	184.1	184.1*	179.5	+2.6
Crane, truck mounted	164.2	164.2	164.2	0
Crane, tractor mounted	135.1	135.1	135.1	0
Bucket, clam shell	152.7	152.7	152.7	0
Bucket, dragline	180.8	180.8	180.8	0
Scrapers and Graders	158.8	158.8	158.0	0
Scraper, 4 Wheel, 8-10.5 cu yd	155.0	155.0	155.0	0
Scraper, 4 Wheel, 12-15 cu yd	151.3	151.3	151.3	0
Scraper, 2 Wheel, 14-18 cu yd (a)	122.7	122.7	122.7	0
Grader, heavy duty	164.0	164.0	164.0	0
Grader, light & medium	161.2	161.2	161.2	0
Tractors (non-farm, incl industrial)	182.2	180.5	180.8	0
Wheel-type, off highway (a)	129.2	128.4	127.7	+1.2
Crawler-type, 45-60 dhp	185.3	182.7*	182.6	+1.5
80-80 dhp	188.5	185.8	185.8	+1.5
80-120 dhp	186.7	186.7	186.7	0
120 and up dhp	191.8	191.8	191.8	0
Machinery, Tractor Mounted	161.7	161.7	161.7	0
Dozer, cable controlled	151.6	151.6	151.6	0
Dozer, hydraulic controlled	177.3	177.3	177.3	0
Cable power control unit	147.9	147.9	147.9	0
Loader, shovel type	153.9	153.9	153.9	0
Specialized Machinery	150.7	150.7	147.0	+1.1
Ditcher	154.1	154.1	154.1	0
Roller, tandem	193.2	193.2	193.2	0
Roller, 3 wheel	161.6	161.6	161.6	0
Ripper and rooster	143.3	143.3	143.3	0
Dewatering pump, 10 M gph	111.7	111.7	110.1	+1.5
Dewatering pump, 90 M gph	144.3	144.3	135.6	+6.4
Portable Air Compressors	159.1	159.1	159.1	0
Contractor's Air Tools	164.5	164.5	164.3	+0.1
Mixers, Pavers, Spreaders	150.1	150.1	149.3	+0.3
Mixer, portable, 11 cu ft	160.1	160.1	155.4	+3.0
Mixer, portable, 16 cu ft	163.7	163.7	159.6	+2.6
Mixer, truck, 6 cu yd	127.3	127.3	122.1	+4.3
Mixer, paving, 34 cu ft	183.9	183.9	174.6	+5.3
Concrete finisher & spreader	181.5	181.5	173.0	+4.9
Bituminous distributor	122.4	122.4	115.9	+5.6
Bituminous spreader	160.3	160.3	160.3	0
Bituminous paver	153.0	153.0	155.3	-1.5
Off-Highway Trucks, Wagons (b)	100.6	99.0	—	—
Contractors off-highway truck (b)	100.6	99.0	—	—
Trailer dump wagon (b)	101.4	100.0	—	—

* a January, 1955=100 • b January, 1958=100 • Revised
BLS Primary Market Price Indexes, U.S. Department of Labor, 1947-49=100

Equipment Prices Continue to Rise

The trend to higher price tags on construction equipment is spreading slowly. The upward trend is not unanimous, but more and more manufacturers are posting price hikes.

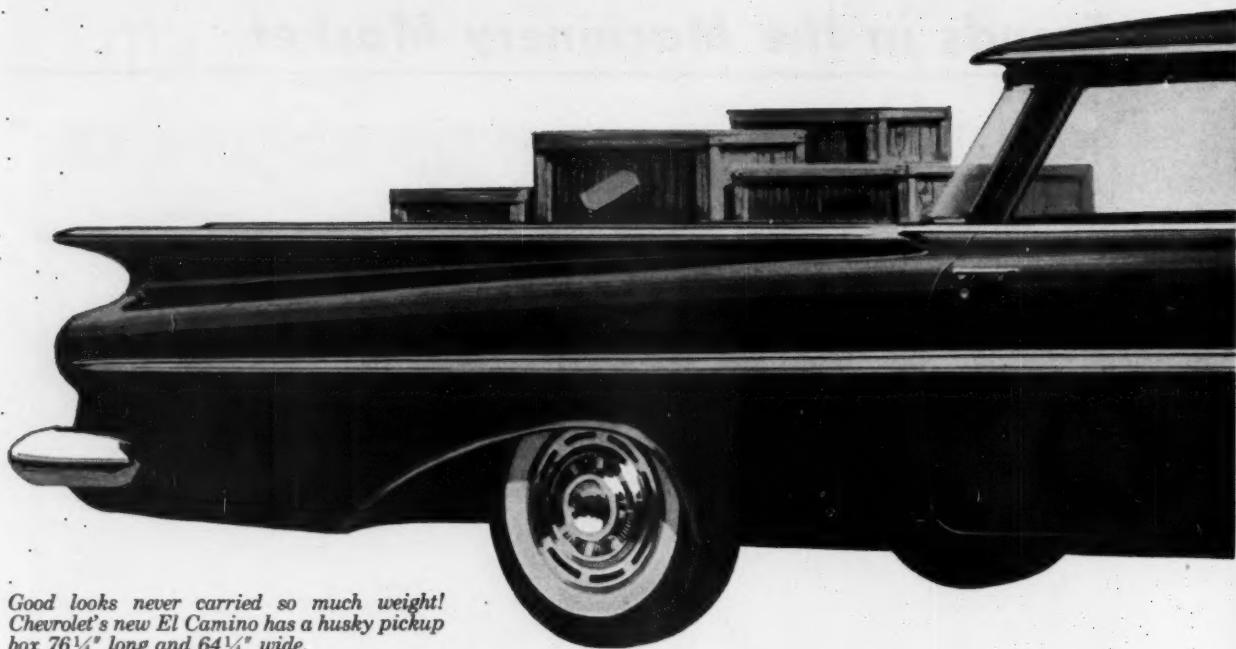
The impact of the price increases shows up in the Bureau of Labor Statistics index of manufacturers' prices. This index rose again in October to set a new high of 166.7, based on average prices in 1947-49 as 100. The October value compares with 165.6 in August and 166.0 (revised upward) for September.

Though the BLS over-all construction equipment price index moved up only 0.6% during the two months span, August-October, certain makes and models are up much more than this. By contrast, many machines have not changed in prices. And a few makers don't anticipate any price changes.

On the other hand, some manufacturers have raised prices since October 15, and these increases are not yet reflected in the BLS index. Moreover, some equipment makers expect to hike prices.

An addition to the list of firms that have announced price hikes (CM&E, November, p. 41), is Baldwin-Lima-Hamilton. It raised prices for crawler power shovels an average of roughly 3% on November 15. Caterpillar Tractor early this month upped prices 3% to 5% on certain crawler tractor models, a front-end tractor shovel, and the No. 12 grader. Scraper prices were unchanged.

Among other manufacturers who have yet to make any change in their prices, at least two are likely to announce increases soon. Mack Truck Co. expects to raise prices on its off-highway rear dump trucks by about 3%. And Barber-Greene prices are likely to move up by late December.



Good looks never carried so much weight! Chevrolet's new El Camino has a husky pickup box 76 $\frac{1}{4}$ " long and 64 $\frac{1}{4}$ " wide.



New 1959 Chevrolet Series 60 stake—a built-to-last hardwood body teams up with tough truck chassis components and modern valve-in-head power to put you dollars ahead on every haul!



This 1959 Chevrolet Series 100 heavyweight provides 48,000-lb. G.C.W. . . . comes equipped with big 230-h.p. Workmaster V8 engine with Wedge-Head design!

THE BEST YET OF THE BEST SELLERS...



CHEVROLET

TASK-FORCE 59 TRUCKS

For '59, the brightest new ideas in trucks are Chevrolet's! There's the glamorous new El Camino to set a new standard in styling . . . new features and refinements in every model to set new records for saving!

Chevy's serving up something special for '59—the soundest, savingest, sharpest looking line of haulers that ever hustled a load! For evidence, consider the dazzling all-new El Camino. It combines the slimlined beauty of the '59 Chevrolet passenger car with the ability to handle man-size hauling jobs!

Or take the pickups of Task-Force 59—a dozen big-bodied beauties that can fill the bill on scores of jobs with five handsome Fleetside models, seven handy

Stepside pickups, including 4-wheel drive models. A new edition of the famous Thriftmaster 6, standard in light-duty models, delivers up to 10% greater fuel economy—up to 20% with new maximum economy option.*

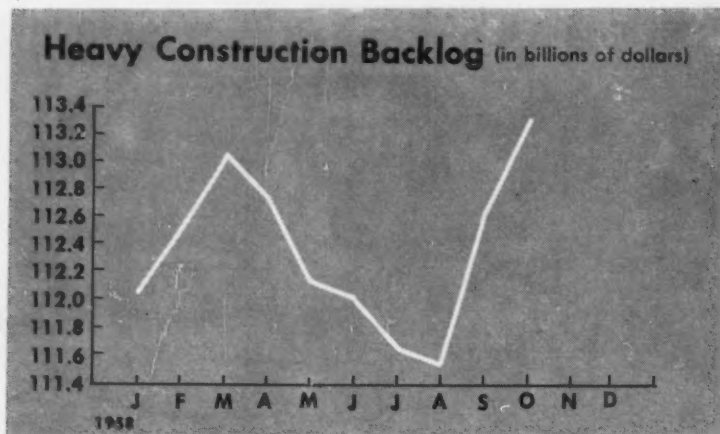
And the picture's just as bright in the medium- and heavy-duty classes. Here, you'll find V8 power that's new and tougher built, too . . . with axles, transmissions, frames and brakes that are refined and improved to whip the toughest runs without a wheeze or whimper.

Whether your truck is a light-, medium-, or heavy-duty job, *these* are trucks you've got to see! They're on display right now at your Chevy dealer's. . . Chevrolet Division of General Motors, Detroit 2, Michigan.

*Optional at extra cost.

NEW MIGHT, NEW MODELS, NEW MONEY-SAVING POWER!

Construction Business...



Proposed Construction Lifts Backlog to New Record High

THE BACKLOG of Heavy Construction in the planning stage is climbing again. This reversal of a five-months downtrend in total plans is due to a big rise in new proposed projects, reported by *Construction Methods*.

On October 31, the Backlog reached an all-time high of \$113.3 billion. This is \$300 million more than the previous record of last March 31, and it's a whopping \$3 billion more than a year ago. Moreover, the continued upsurge in new proposed work last month indicates that the November 30 Backlog will take another big upward step—perhaps hitting close to \$114 billion.

This spurt in new proposed construction projects entering the planning stage is what's needed to firm up the lagging heavy construction market. It is particularly encouraging because October brought substantial increases in volume of proposed private and non-federal public works. Proposed projects in each of these categories fell off during the July-September period.

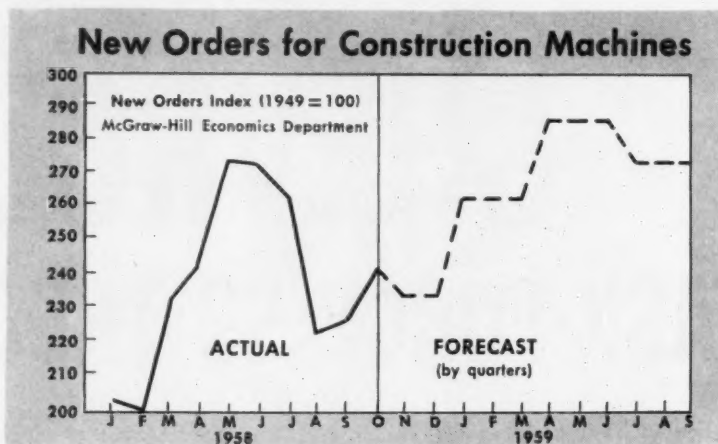
Projects reported by *Construction Methods* as proposed during October had a total estimated construction cost of \$1,834 million. This is 5% more than was proposed in October, 1957, and equals the all-time high for the month set in October, 1956.

The \$930 million in state and

local public works proposed in October was the highest monthly total in 14 months and was more than double the low September volume.

A big increase in industrial building plans sparked the October jump in proposed private heavy construction. This new up-trend in proposed industrial building continued during November. Though recent surveys of capital spending plans and appropriations have indicated that the decline is ending late this year, *Construction Methods* reports are the first to spot a rise in plans for industrial construction specifically.

The rebound in total proposed private construction is not sensational, measured in dollar volume, but it's crucial because it points to an upturn in future pri-



Machinery Makers Expect Happy New Year

Machinery makers look for construction contractors to place a record volume of orders for new equipment next year.

This is the consensus of manufacturers reporting their predictions to the McGraw-Hill Department of Economics. From a September, 1958, value of 226, based on 1949 sales as 100, they forecast that the New Orders Index will rise to 233 in the fourth quarter of this year; to 261 in the first quarter of 1959; and to 286 in the second quarter of next year. The third quarter of 1959 is expected to bring a seasonal dip in orders to an index value of 273.

Manufacturers are thus looking for the 1958 upturn in contractors' purchases of new machines to continue next year. Their forecasts indicate a record order volume in the first nine months of 1959, topping 1958 by 15%.

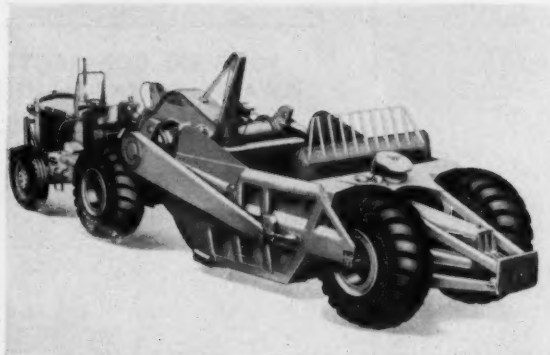
The forecasts of the manufacturers are about in line with the level of heavy construction contract awards predicted for 1959 by *Construction Methods*.

For next year, *Construction Methods* forecast a jump of 14% in awards of highway construction jobs and a gain of 10% in awards of all non-building heavy construction contracts (CM&E, August, p. 45).



PROJECT PAYDIRT pays off for you...

NOW 2 SCRAPERS FOR THE DW20!



The popular LOWBOWL NO. 456

18 cu. yd. struck
25 cu. yd. heaped

To broaden the profitable uses of the high-speed DW20 four-wheel Tractor, Caterpillar now offers a big new LOWBOWL Scraper—the No. 482, rated at 24 cu. yd. struck, 34 cu. yd. heaped.

The popular No. 456, rated at 18 cu. yd. struck and 25 cu. yd. heaped, remains in the line. As a result, this provides you with a choice of two sizes of rugged, heavy-duty scrapers to better match the DW20 to the material and haul conditions on your job.

In short, here's where each scraper will fit best for maximum production at lowest cost per yard: The No. 482—in good loading conditions and haul roads of minimum grades and low rolling resistance. The No. 456—on adverse grades and average-to-high resistance haul road conditions.

In addition to the Cat No. 482 and No. 456 Scrapers, a complete Athey wagon line is available for use with the DW20. Whatever the job, you'll find the right earthmovers for it at your Caterpillar Dealer. See him today for complete facts about the big new No. 482.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

PROJECT PAYDIRT:

Caterpillar's multi-million-dollar research and development program—to meet the continuing challenge of the greatest construction era in history with the highest production earth-moving machines in the field.

The new LOWBOWL NO. 482

24 cu. yd. struck
34 cu. yd. heaped



Additional facts about the No. 482

Like all developments of Caterpillar's PROJECT PAYDIRT, the No. 482 has been thoroughly tested in the field. Its high capacity offers the increased production essential to profitable performance on today's big jobs. It uses 33.5 x 33 (26-PR) tires. It is cable operated for fast, accurate control. Its three-piece "Spacesaver" draft frame can be disassembled to provide a shipping width of only 11' 6"—three inches narrower than the No. 456. Its new bowl lift design and new push block arrangement increase loading and dumping efficiency. And its sturdy, simplified construction delivers many hours of trouble-free operation with minimum maintenance.

CATERPILLAR

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GRADERS • EARTHMOVING EQUIPMENT**

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PROVED IN THE FIELD**

On Penn Turnpike



Cleveland 110 speeds drainage improvement

The Job..... installing 20 miles of drain tile for improvement of drainage along the Pennsylvania Turnpike between Perry and Beaver Interchanges.

The Digging in hard shale under 10 inches of tough aggregate in the shoulder of the pike.

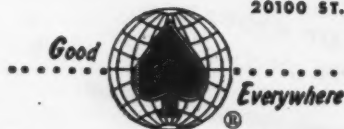
The Record..... the Cleveland boosted daily trench production 300% — to 2,400 feet per day. No other type of machine previously had been able to get more than 600 feet per day.

The Contractor.. Harrison Construction Co., Pittsburgh

accurate...fast...dependable...clean
— there's nothing like a Cleveland for trenching

The CLEVELAND TRENCHER Co.

20100 ST. CLAIR AVE. • CLEVELAND 17, OHIO



CONSTRUCTION BUSINESS ... continued

vate construction contracts. *Construction Methods* forecasts a 1% rise in private contracts in 1959 compared with 1958 (CM&E, August, p. 45).

SOME BIG CONTRACT AWARDS OF THE MONTH

Winston Bros., Johnson, Drake & Piper, Inc., Green Construction Co., American Pipe Construction Co., Foley Bros., a joint venture at 301 Clifton Ave., Minneapolis, Minn. Construct power structures, down stream tunnels and liners, Oahe Reservoir Project, near Pierre, S. D. Corps of Engineers, 1709 Jackson St., Omaha 2, Neb. \$25,306,349.

M & K Corp., 519 California St., San Francisco, Calif. Construct a seven-story Hall of Justice building in San Francisco, Calif. City and San Francisco County, Dept. of Public Works, City Hall, San Francisco, Calif. \$12,508,500.

Fluor Corp., Ltd., 2500 Atlantic Ave., Los Angeles, Calif. Remodel and convert catalytic reformer refinery unit at Beaumont, Tex. Magnolia Petroleum Co., N. Esperson Bldg., Houston, Tex. \$7,000,000.

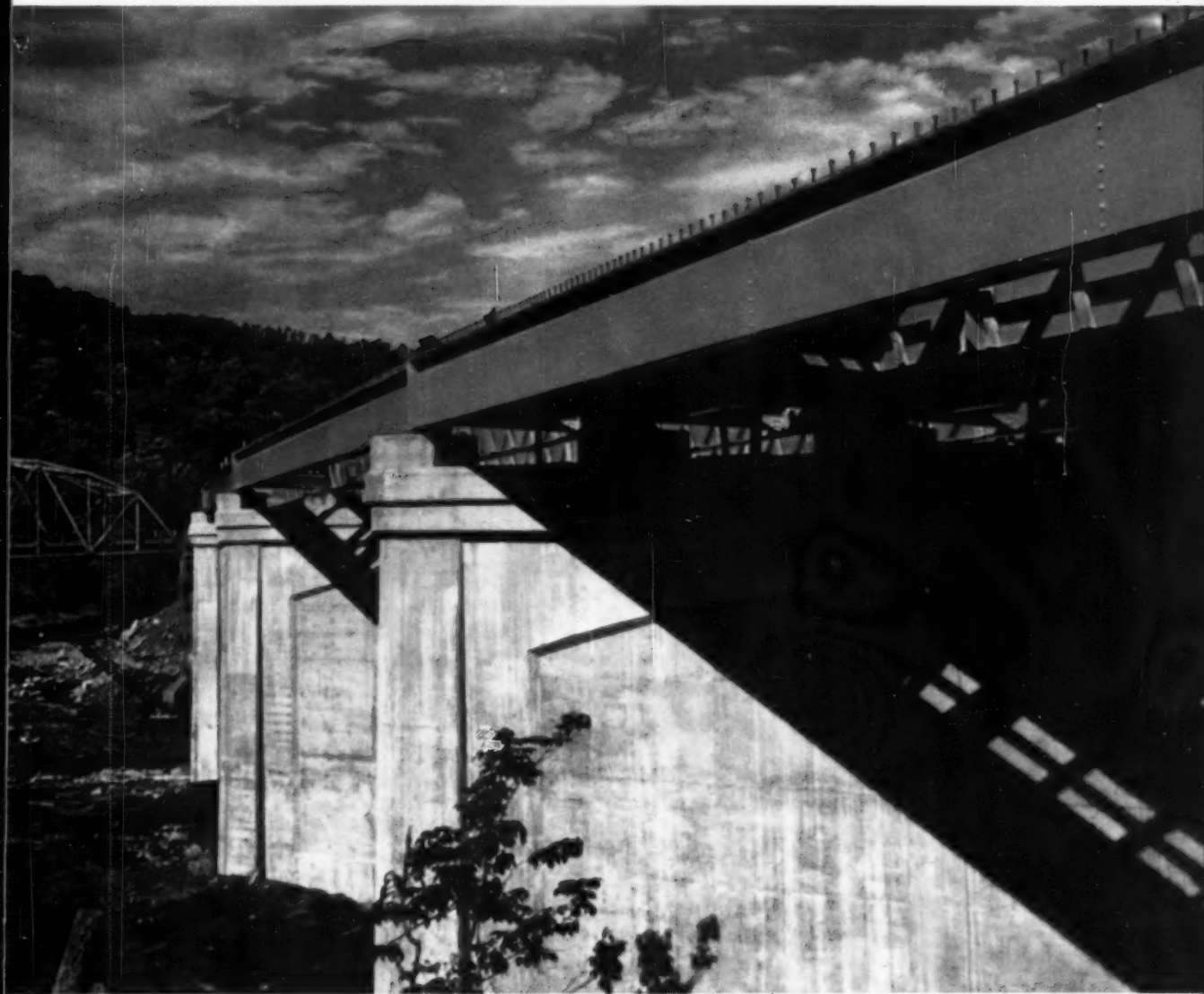
E. A. Irish Co., Box 39701, Griffith Station, Los Angeles, Calif. Construct portions of third sections of San Diego Aqueduct, San Diego Co. Water Authority, 2750 Fourth Ave., San Diego, Calif. \$6,562,895.

Summer Sollitt Co., 307 N. Michigan Ave., Chicago 1, Ill. Construct one-story factory and office building in Berkeley, Ill. Webcor Inc., 5601 W. Bloomingdale Ave., Chicago, Ill. \$6,000,000.

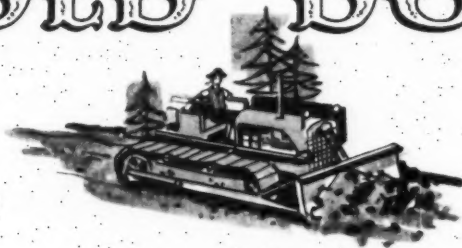
The Auchter Co., 57 Evergreen St., Jacksonville, Fla. Construct a City Hall building at Jacksonville, Fla. Jacksonville City Comm. Jacksonville, Fla., \$5,236,000.

Blaw-Knox Co., 300 6th Ave., Pittsburgh, Pa. Construct universal slabbing mill at Fontana, Calif. Kaiser Steel Div., Henry J. Kaiser Co., 1924 Broadway, Oakland, Calif. \$5,000,000.

STEEL DOES THE JOB. Many tons of Bethlehem structural steel and reinforcing bars were used in this new dual bridge on Route 60, over the Jackson River near Covington. Fabricator: Roanoke Iron & Bridge Works, Inc.; General Contractor: McDowall & Wood, Inc.; Erector: E. F. Blankenship Co.; Reinforcing steel fabricated by Virginia Steel Co., Inc., and Montague Betts Co., Inc.



HIGHWAY PROGRESS IN THE OLD DOMINION





Steelwork for South Crossing of Turnpike's Appamattox River between Colonial Heights and Petersburg. This bridge is the largest of the Bethlehem-built structures on this new 4-lane traffic artery. Contractor for substructure and deck: Blythe Brothers Co.



Turnpike Authority chose structural steel for bridges because of its economy and durability. These Bethlehem Structural Shapes are in Wythe St. Bridge, Petersburg.



Lombardy St. Crossing, near northern end of Turnpike. This is one of 40 Turnpike structures erected in Richmond.



STEEL in many forms for Virginia's Highways

In Virginia they're not just talking about the need for better highways. They're doing something about it. A vigorous statewide highway improvement program has been under way ever since the end of World War II. During this 13-year period the Virginia Department of Highways has had the immense responsibility of allocating approximately \$1,056,740,000 in highway funds.

Bethlehem has played a major part in this huge task of highway improvement—in fabricating and erecting the steelwork for bridges large and small, and in supplying a wide variety of highway steels. Some of this activity throughout the state is shown in the accompanying pictures. On page 4 is a long list of steel supplied by Bethlehem to the construction industry.

77 Bridges... and they're all steel

The Richmond-Petersburg Turnpike, a new high-speed toll road opened to traffic in mid-1958, contains 77 bridges in its 34.7-mile length. A large number of these were fabricated by Bethlehem for the Richmond-Petersburg Turnpike Authority. Four of the steel structures are shown at left, and immediately below.

BETHLEHEM STEEL



Bethlehem-built bridge carries the 4-lane Turnpike over right-of-way of Atlantic Coast Line Railroad, in Dinwiddie County.



NO DRAINAGE PROBLEMS WITH STEEL PIPE. This 48-in. culvert pipe, fabricated from Bethlehem galvanized sheets, is being installed by Wright Contracting Co., near Harrisonburg.



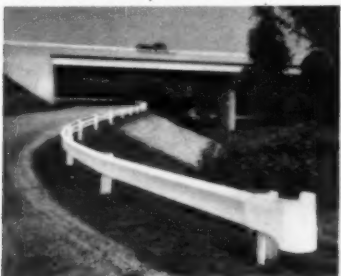
DRILL STEEL BITES DEEP INTO SANDSTONE. Crawler-type drilling rigs, fitted with Bethlehem Hollow Drill Steel, bore blast holes at site of overpass at intersection of Routes 11 and 33.



STEEL SINEWS FOR OVERPASS. Bethlehem Reinforcing Bars protrude from concrete columns during construction of bridge on Route 33. Contractor: Wright Contracting Co.



H-PILES TO SHOULDER THE LOAD. These Bethlehem H-Piles have been driven to bedrock for the foundations of a new bridge on Route 29 Bypass, which will skirt Lynchburg.



MOTORISTS FOLLOW THE BEAM. Bethlehem Beam Guard Rail, mounted on sturdy steel posts; installed along curve near Petersburg. Contractor: Blythe Brothers Co.



RAPPAHANNOCK RIVER BRIDGE. Bethlehem fabricated and erected 12,690 tons of steel for the superstructure of this cantilevered structure which spans the historic Rappahannock at White Stone, on Route 200, approximately 8 miles from Chesapeake Bay. It is the largest bridge ever built for the Virginia Department of Highways. Designers: Modjeski & Masters.

A Complete Line of Construction Steel

- Abrasion-resisting steel
- Bar mats and welded fabric
- Barbed wire
- Blast furnace slag and commercial stone
- Bridge floor
- Bridge rail
- Cables for suspension bridges
- Center strip and keyway
- Centering, solid steel over joists
- Culvert sheets, galvanized
- Curb facing
- Digging bars
- Drill steel, hollow and solid
- Dowels, hook-bolt
- Dowel units

- Fabricated steel bridges and buildings
- Fasteners of all types
- Fence and posts
- Form stakes
- Form wire
- Guard rail—beam and cable
- Hardware, timber bridge
- High-strength bolts
- Joists, open-web, shortspan and longspan
- Nails
- Paving steels
- Piling, steel sheet and H-piles
- Pipe, large-diameter welded
- Pipe piles
- Pipe

- Plate
- Posts, steel fence
- Posts, steel guard rail
- Reinforcing bar accessories
- Reinforcing bars, plain and fabricated
- Rock bolts
- Roofing and siding, steel
- Structural steel shapes
- Tool steel
- Tunnel-liner plates
- Tunnel ribs
- Tunnel segments
- Wire rope and slings
- Yieldable arches for tunnel roof support

Bethlehem Steel Company
701 E. Third Street
Bethlehem, Pa.

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Descriptive literature is available on most of these Bethlehem products. And our catalog, "Steel for Highways," provides details on many of the steel products which are used in highway construction.

If you'd like more information, just fill out the coupon at left.

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These International TD-24 Tractors are working on a connection between the New York and New England Thruways. According to their owner's they've given uninterrupted service since delivery in May, 1956.

9 torque converter equipped TD-24's show endurance on huge N. Y. highway job

The immense job involved some 1,270,000 cubic yards of earth and rock excavation, 22 bridge structures and 11.93 miles of pavement for the connection between the New York and New England Thruways. The \$13,572,000 contract went to two prominent New York contractors, Rusciano Construction Corp. and Del Balso Construction Corp. And the really tough jobs were handled by nine International TD-24 Tractors equipped with torque converter drives.

"Availability" was the key to profitable machinery operation on this project. And as both contractors pointed out: "Each of these nine TD-24's has given us continuous and uninterrupted service since delivery in May, 1956."

The torque converter multiplies engine torque up to 6:1 . . . permits

the engine to deliver maximum horsepower whenever required . . . automatically matches power to load demands . . . and instantaneously matches tractor speed to scraper travel, for faster loading and less shock between the machines.

With a torque converter drive, gear-shifting is minimized or eliminated, for higher operator efficiency and less fatigue. Load pick-up is smooth and even, without clutch slippage. Shock loads and vibrations are cushioned out, for longer tractor life and less maintenance.

All three of the "big three"—Allis-Chalmers, Caterpillar and International offer torque converter drives as standard or optional in certain tractor models. And all three standardize on Twin Disc Torque Converter components for their torque converter drives.

Specify a torque converter, drive in your next track-type tractor. See for yourself how the torque converter proves the wisest possible investment in heavy-duty machinery.



TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division), Rockford, Illinois

NOBLE

Reduces set-up and labor costs over 50% in twin operation of two NOBLE highway batching plants on large airfield job!

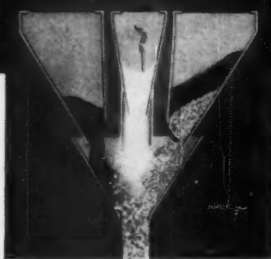
Two NOBLE automatic batching plants in 1-stop arrangement are operated side-by-side to save considerable expense of separate stops for cement and aggregates in construction of Amarillo Air Force Base, Amarillo, Texas. A double driveway permits loading two batch trucks at the same time for simultaneous operation of two paving spreads, each with three dual drum pavers, on this 593,000 cubic yard project. Each 1.4 cubic yard batch contains five materials — sand, $\frac{3}{4}$ " rock, $1\frac{1}{2}$ " rock, portland cement and natural cement. On a 17 second batch-cycle, twin plant weighs and delivers fourteen batches into two 7-compartment trucks in less than two minutes. Automatically controlled batcher dump cycle preblends cement and aggregates. Eliminates cover-up man and necessity for separate cement compartments in batch trucks. Two men operate this twin one-stop plant compared to four or more men for a pair of conventional 2-stop or 3-stop plants. Overhead storage for 500 barrels of portland and 500 barrels of natural cement. Two 550 barrel-per-hour elevators permit handling both types of cement simultaneously. Selector gates permit handling either type of cement by both elevators. Storage for 300 tons of aggregate. Unlike most large plants, this set-up can be separated when concrete requirements taper off. One unit can finish the airfield while the second is released for another paving job.

T. L. James & Co., Inc. and W. R. Aldrich & Co., general contractor.

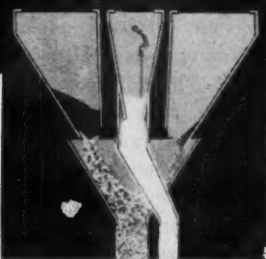


FASTEST FIELD ERECTION AT LOWEST COST!

- ✓ Pre-wired and sub-assembled at factory . . . no outside purchase of essential components.
- ✓ Fast set-up of section-on-section reduces costly crane time.



3 batchers (2 for aggregates, 1 for cement) weigh materials simultaneously for a single batch.



Cement may be discharged into a separate cement can when specifications require.

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In financial aid to education...

What Should Business Do Now?

Now that the federal government is entering the field, should business firms stop giving financial aid to our colleges and universities?

This question is now being discussed by business directors throughout the country. The discussion is prompted by the near-billion-dollar program of federal aid to education passed by Congress a few months ago. For if the federal government, with its access to billions in taxes, is assuming responsibility for the financial welfare of education, should not business get out of the way and let the government take over? This is the general way the question is being asked.

The answer is a resounding NO.

What The Federal Program Does

The new federal program makes it possible for the government to spend the imposing total of \$900 million for aid to education over the next four years. There are still many loose ends in the program. But already it's quite clear what such funds will — and will not — do to help relieve the financial plight of our colleges and universities.

First of all, the program is not going to solve any financial problems in education overnight.

The program is just barely underway. So far no money has actually been allocated, and Congress has appropriated only \$40 million — less than 5% of the total.

More important, there is very little in the total program which will result in direct aid to colleges and universities. The program does set up fellowships to train college teachers. But most of the aid will eventually be channeled through the states to primary and secondary schools. The main focus of the program is education for national defense — strengthening science, mathematics and foreign languages in elementary and secondary schools, together with grants for counseling, testing and research.

The one big item for higher education is a \$295 million student loan program, which will help needy students pay tuition and other fees. But tuition rarely covers the full cost to the college of educating a student. So the net result could well be an additional financial strain on our institutions of higher learning.

For the three most pressing financial needs — faculty salaries, scholarship grants and new plant and equipment—colleges and universities must still rely heavily on help from the business community. And it would indeed be a major

misfortune if the recent actions of the government put a blight on this growing and substantial support to higher education.

In the last ten years, business has expanded its financial aid to education by more than four fold. In 1948, contributions were only \$24 million. In 1957, such aid reached an estimated \$125 million. Moreover, corporations have been putting a larger proportion of their total charitable gifts into education. In 1950, the percentage was only 17%. By pre-Sputnik 1956, the share had already increased to 34%, according to figures recently released by the Council for Financial Aid to Education.

Why Business Must Help

The most compelling reason for increasing business aid to higher education — at an even faster rate—is that our colleges and universities desperately need financial help. It is that simple. Private contributions to higher education must average at least \$400 million over the next ten years if our colleges are to meet rising operating costs and raise faculty salaries to decent levels. Despite the growth in business contributions, we are still well below that goal.

If our colleges cannot solve their mounting financial difficulties through voluntary help from business firms, alumni and communities — then it is to be expected that federal aid ultimately will be mobilized in a big way. In principle, if not in dollars, the 85th Congress has paved the way. Indeed, a large federal scholarship program was squeezed out of this year's legislation only in the course of last-minute compromises. And Arthur S. Flemming, Secretary of Health, Education and Welfare, has urged that the next session of Congress restore the scholarship program.

About any federal rescue operation for higher education, two things are quite clear:

- (1) Such aid will come too late to prevent irreparable harm resulting from the current shortage of funds. The need for help is urgent and immediate.

- (2) With federal taxes taking over half of all corporate income, any federal program in the end will be financed in large part by the business community.

An Opportunity

So, viewed narrowly, it is in the selfish interest of business firms to aid our colleges and universities now, rather than wait and be forced to pay later on. By doing so, they ensure that business will have a continuing supply of well-trained graduates. They take advantage of the tax laws for charitable contributions which mean the government in effect assumes more than half the cost of business aid to education. And they win gratitude for a voluntary and generous act.

Viewed in the broad public interest, the business community has an opportunity to perform a financial rescue mission in education which could well be the key to successful survival, not only of our present system of higher education, but also of the nation itself.

As previous editorials in this series have pointed out, a very small share of the net income of business firms — about 1% — would do the job. Certainly business must not be distracted from this opportunity by the new venture of the federal government in financial aid to education.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nation-wide developments. Permission is freely extended to newspapers, groups or individuals to quote or reprint all or parts of the text.

Donald C. McGraw

PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.



2000 TONS OF SHOT ROCK PER SHIFT



... that's the loading pace set by this 1½-yard American 700 Series Shovel at the Riverview Stone and Material Company quarry in Florissant, Mo. Nothing proves shovel durability like rock work ... and American owners report hundreds of hours of trouble-free, high volume production *in rock!* Rugged design, quality manufacture and smooth power with precise control put bigger profits in jobs done with American. Your nearby Distributor has facts on this *complete* line of crawler and truck cranes and excavators.

◀ **16½ TON PRECAST SECTIONS** are handled on \$10 million Atlanta Farmer's Market project. Thompson and Street, Atlanta contractor uses a 30-ton American 300 Series Truck Crane to lift sections from forms—set in position. It's tricky crane work that demands smooth, positive boom and load control!

STICKY GUMBO and water seepage were problems faced by Sussex Excavating Co. on this basement job. But, with their ½-yard American 100 Series Backhoe, the Sussex, Wis. firm dug 385 yards in 7 hours—proof of American performance in any situation.



EXCAVATORS-CRANES
to 2 yds.-55 tons

LOCOMOTIVE CRANES
to 130 tons

DERRICKS-HOISTS
to 800 tons

REVOLVER CRANES
to 400 tons

AMERICAN HOIST
and Derrick Company

St. Paul 7, Minnesota

AMERICAN HOIST
PACIFIC COMPANY

Special materials
handling equipment

CROSBY-LAUGHLIN
DIVISION

Drop forged fittings
for wire rope-chain

Take it from the man in the driver's seat...here are big reasons

why operators recommend ...to increase your daily



▲ "The International Payscraper does not nose over or up in tight spots," states Operator Cecil Dickson, for C. & Z. Construction Co., Memphis, Tenn. The three "75's" in this fleet each get a heaped 22-yard load in 25-32 seconds—with the TD-24 as pusher. The job: building farm-to-market road near Covington, Tenn.

▶ Operating safety is essential on mountain terrain: Ripon Construction Co., working near Weaverville, California, appreciate International "75" Payscraper safety—handling a sub-contract on a road in mountainous Trinity County, with three "75's" and two TD-24's for pusher power. Cuts run to 75 feet deep!

Payscrapers production!

Riding on the shock-absorbing, deep-padded seat, the International Payscraper® operator soon learns he can cross rough spots—ascend or descend steep pitches, loaded or empty—without neck-snapping, spine-smacking jolting or bouncing. He practically gets automotive riding comfort!

When he needs positive braking, he has powerful, heavy-duty four-wheel air brakes—synchronized on both tractor and scraper wheels—to decelerate and stop surely, even with heap loads on steep grades. And for “walking” the rig through soggy going, he has auxiliary hand-braking of the individual drive wheels!

Guiding a big earthmover is no longer an athletic event—no longer demands “muscle” or tussle! The Payscraper gives him exclusive Hydro-Steer—hydraulic steering powered for smooth, positive one-hand turns! Even the clutch is air-assisted for operating ease and fast, positive action!

And an operator has no fear of “nose-diving” or jack-knifing—not with International Payscraper design! The oscillating hitch assembly and forward pitched spindle prevents these machine contortions! Low center of gravity means extra stability, too, on uneven terrain:

These are big reasons why operators have the confidence to use full Payscraper power and speed—to give you full capacity and cycle-speeding loading, hauling, and return!



This new TD-20 is pusher for a pair of fast-loading “55” Payscrapers—on a street improvement project in Denver. Horn Construction Co. is the contractor.

“Our three ‘55’ Payscrapers are best for our land clearing and stripping needs in this sandy area—and we compared thoroughly with competitive machines,” states Tom Hutchinson, for Hutchinson Bros., Inc., Pompano Beach, Fla. “We like the way the ‘55’s’ boil up a full load fast; then get to the fill and back quick!”



Get in the driver's seat—get the operator's feel of International Payscraper performance. See for yourself what a big factor complete operating ease and confidence can be in increasing earthmover capacity! See your International Construction Distributor for a demonstration!



**International
Construction
Equipment**

International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors...Self-Propelled Scrapers and Bottom Dump Wagons...Crawlers and Rubber-Tired Loaders... Off-Highway Haulers...Diesel and Carbureted Engines...Motor Trucks...Farm Tractors and Equipment.



NEW International® Drott with Four-In-One

**CAPACITY...to outload 100 hp
"single-action" rigs
PLUS VERSATILITY UNLIMITED...
of exclusive clam-action**

Sized, powered, geared, and controlled to decisively outproduce any "single-action" loader in the 100-hp field—the new 2¼ cu yd TD-15 4-In-1 gives you exclusive International Drott clamshell action!

Here's new big-job-sized versatility unlimited! Simply move the selector lever from the tractor seat with fingertip ease—to get any one of four big-capacity machine actions needed. On big job after big job, the TD-15 4-In-1 can replace costly limited-action machines one after another!

And whether this 4-In-1 replaces four or forty machine actions for you, you get it for one moderate price!

Smooth, years-proved, 115 hp 6-cylinder International diesel engine in the new TD-15 4-In-1 gives you full advantage of increased hydraulic system capacity—of new 6-speed, full-reverse transmission mobility—of new cycle-speeding forward-reverse Shuttle-Bar control!

Correct balance and long-track stability eliminate the need for counterweighting the TD-15 4-In-1. Track length on the ground is a full 98¾ inches!

There's only one way to size-up new TD-15 4-In-1 performance—to measure its job range and capacity—to compare its money-making capabilities to a yard-full of one-purpose rigs. That's to get on the deep-cushioned seat and prove to yourself what it can do. See your International Drott Distributor for a demonstration!



"Concrete-bucking" pry-action break-out breaks up, digs up, and loads out old pavement—gives a big profit-advantage to the contractor, over single-action rigs that lack 4-In-1 pry-over-shoe power! The new TD-15 4-In-1 exerts the tremendous break-out force of 42,650 lbs.

As a **"carry-type scraper"** with cutting edge grading-off an even layer, and "boiling" the bucket full, the new TD-15 4-In-1 gives you a multitude of profitable uses. It can grade, strip, spread, or load-in-place a wide variety of materials with amazing accuracy!

International Harvester Company, Chicago 7, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin



INTERNATIONAL®
DROTT®



TD-15



You'd need a heavy-duty blade outfit to match the earth-rolling, material-digging, performance of the new TD-15 4-In-1! You regulate dozing depth accurately with "radius control," hydraulically, from the tractor seat.

"Back-dragging" with exclusive clamshell action—new TD-15 4-In-1 reduces time and cost of "dressing" a bank—or pulling down material by the truckload! Shuttle-Bar control speeds up back-and-forth cycles on jobs like this!



If You Use Blasting Caps

EXAMINE THESE FEATURES



1 **DEPENDABLE FIRE**—Special alloy is used as the bridge wire in the firing element of Hercules Electric Blasting Caps. Wire is noncorrosive.

2 **ENGINEERED SHELL**—Bronze shell of a Hercules cap goes through fifteen separate operations while it is being expertly shaped.

3 **TOUGH, HIGH DIELECTRIC INSULATION**—Leg wires of Hercules caps are coated with plastic insulation for outstanding toughness, resistance to abrasion, superior dielectric qualities.

4 **SECURELY ANCHORED**—A cast sulfur plug in the upper part of shell anchors entire firing mechanism in place.

5 **WATERTIGHT WATERPROOFING**—A special Hercules waterproofing formulation minimizes the possibility of moisture or dampness penetration.

6 **DOUBLE-PACKED WALLOP**—Bridge wire extends into the priming charge and makes positive contact to give rapid ignition.

7

HERCULES

BLASTING CAPS

Partners in Dependability with Hercules® Explosives

HERCULES POWDER COMPANY

INCORPORATED

Explosives Department: 900 Market Street, Wilmington 99, Delaware
Birmingham, Chicago, Duluth, Hazleton, Joplin, Los Angeles,
New York, Pittsburgh, Salt Lake City, San Francisco



XR58-1

PICTURE OF THE MONTH



Every Day Counts

• The mighty Columbia River rushes through 11 spillway bays of Priest Rapids Dam while excavation for another 11 spillway bays moves ahead within a cofferdam and the 1,025-ft powerhouse begins to take shape. The project, now 62% complete, is about 14 months ahead of the contract schedule. That's important for Merritt-Chapman & Scott Corp., holder of the \$92-million construction contract. M-C&S will get a completion bonus of \$10,800 for every day ahead of the contract schedule they can complete the job.

IF IT'S R/M HOSE ONLY THE ROCK GOES TO PIECES!



Long Life features of HOMOFLEX HOSE Assure *for Your* **"More Use per Dollar"**

Rugged Homoflex Hose is R/M's exclusive construction for use with air, water, other fluids and gases. Strong enough to stand up under the toughest conditions, yet light in weight and flexible as a rope for easier handling . . . even on the roughest, rockiest job site. Exclusive R/M features make Homoflex Hose do a *better* job . . . and *last longer*.

- Mandrel-Made — No Pre-Set Twist, Extremely Flexible
- Inseparable Cover, Strength Member and Tube

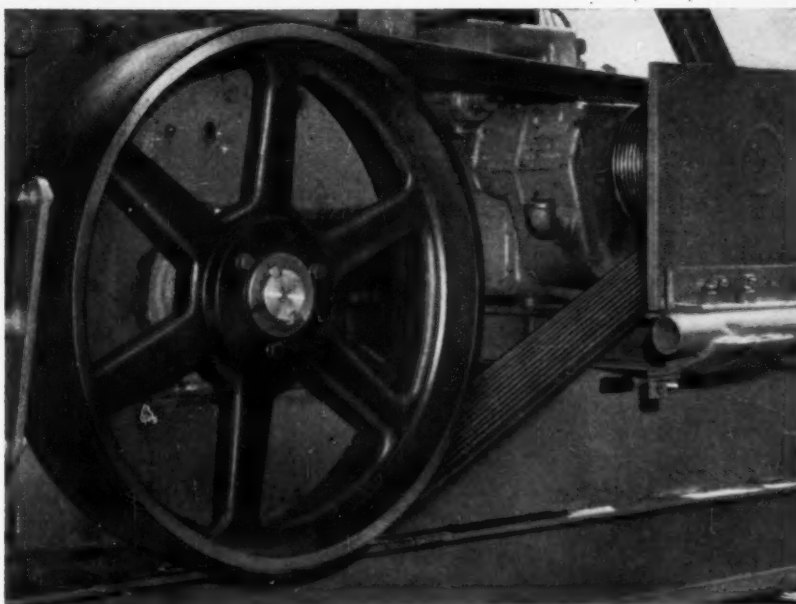
- Coils and Uncoils Freely in Any Direction, Resists Kinking
- Balanced Homogeneous Construction Throughout
- Uniform Inside and Outside Diameters — Easier Coupling
- Withstands High Pressures and Surges with Wide Margin of Safety

R/M has a hose construction engineered to meet every job requirement. Write for Bulletin #6879.



RAY-MAN CONVEYOR BELT — Tough, flexible Ray-Man resists gouging and tearing. Double compensation relieves stress on outer belt plies . . . assures longer belt life and lower cost. High fastener holding ability. Other types available for every bulk materials handling requirement. Write for Bulletins.

R/M POLY-V® DRIVE — New, patented heavy duty drive delivers up to 50% more power in the same space as conventional multiple V-drive . . . equal power in as little as $\frac{2}{3}$ the space. Single unit V-ribbed belt design eliminates multiple-belt "length matching" problems. More constant speed ratios, less wear on belt and sheaves, smoother running. Write for Bulletin #6638.



*Poly-V is a registered Raybestos-Manhattan Trademark.

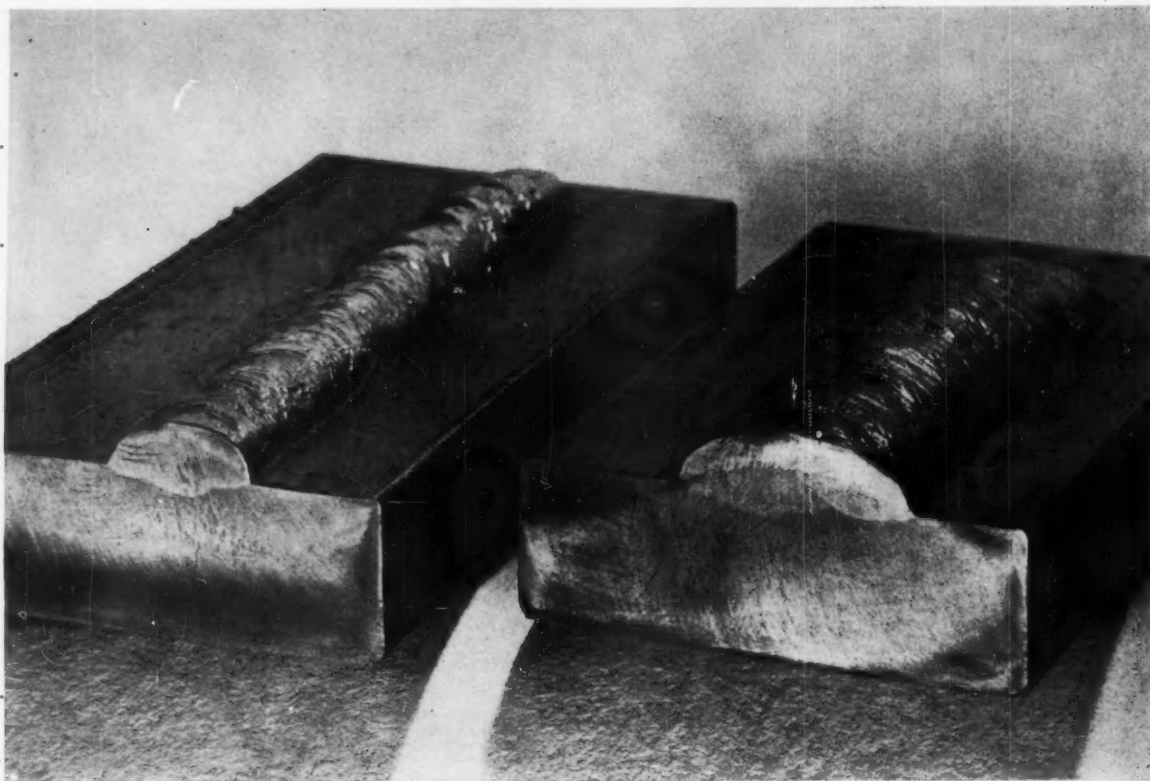
RM 802

BELTS • HOSE • ROLL COVERINGS • TANK LININGS • INDUSTRIAL RUBBER SPECIALTIES
MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products: Abrasive and Diamond Wheels • Brake Blocks and Linings • Clutch Facings • Asbestos Textiles • Mechanical Packings • Engineered Plastics • Sintered Metal Products • Industrial Adhesives • Laundry Pads and Covers • Bowling Balls





Two typical weld samples using Stoody Iron Powder Build-Up. At left is a stringer bead showing high build-up with a single pass. At right is a two pass weaving bead. Etched and polished ends show depth of penetration. Compare these results with your present build-up material.

Try New Stoody Iron Powder Build-Up

...then compare the build-up height!

You can rebuild worn equipment faster and get sounder, tougher deposits with **STOODY IRON POWDER BUILD-UP!**

This new build-up electrode is a "natural" for use on parts made of carbon and low alloy steels. Deposits are tough, rigid, resistant to mushrooming and cold flow.

Most important, *hardness of deposits is not dependent on carbon, but is the result of STOODY BUILD-UP'S balanced alloy content!* This means greater uniformity and overall dependability of deposits—regardless of variations in base metal analysis.

Try **IRON POWDER BUILD-UP** today! Available from your Stoody Dealer (Check the Yellow Pages of your phone book) or write direct.

HOW STOODY IRON POWDER BUILD-UP SOLVES TODAY'S BUILD-UP NEEDS:

1. Makes high deposits in a single pass.
2. Lays down more pounds per hour at a lower cost per pound.
3. Deposits are tough and rigid, resistant to cold flow and deformation.
4. Provides strong support for overlays.
5. Won't spall, work-harden or crack.
6. Deposits will not exceed 45 Rc in hardness even when quenched.
7. Deposits are machinable.
8. Excellent weldability with minimum spatter and smoke.

STOODY COMPANY

11902 East Slauson Avenue • Whittier, California

Construction News in Pictures . . .

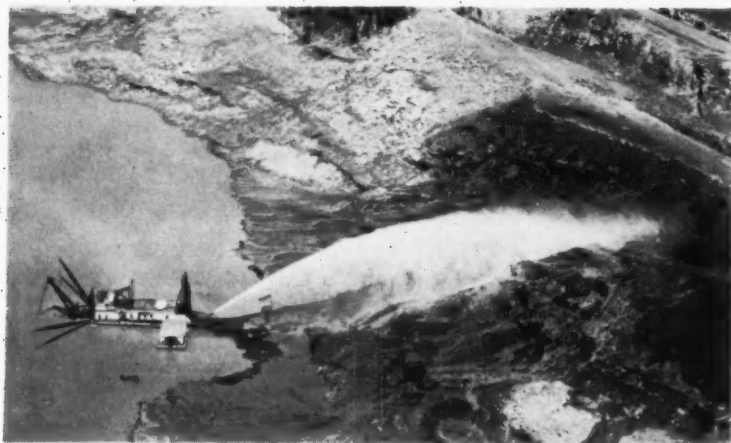


Man-Made Mountain

Earthmovers place the last of 15,500,000 cu yd of fill for Swift Dam on the Lewis River in Washington. The structure is 1,950 ft thick at the base, stands 512 ft high, and is 2,100 ft long at the crest. Contractor for the Pacific Power & Light Co. hydroelectric project is a joint venture of J. A. Jones Construction Co. and Charles H. Tompkins Co.

Heavy Bracing

Basement of the Georgia State Public Health Building in Atlanta is only 30 ft deep, but George A. Fuller Co. has an elaborate bracing system to support adjacent structures. They drive steel sheet piling 40 ft deep around the perimeter and install walers and raker braces at two or three levels as excavation proceeds.



Hydraulic Earthmoving

Big dredge works as a monitor, removing overburden that covers a rich asbestos ore deposit on the shores of Black Lake in Quebec. The dredge pumps about 35,000 to 45,000 gpm through a 12-in. dia nozzle. It is operated by Construction Aggregates Corp. of Chicago for a contract with Lake Asbestos of Quebec, Ltd., the mine owner.

continued on page 54



American build more road



Erected in just 5 days. How the dimensional accuracy of USS AmBridge Sectional Plate assures precision fit in the field is demonstrated in the installation of the long pipe-arch shown above. Measuring 112' long, having a 12'6" span and a 7'11" rise, this giant drainage structure was erected in just five working days by a five-man crew, plus crane.

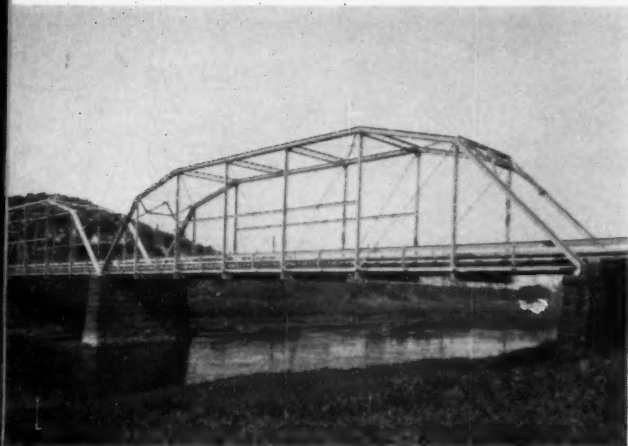
Erected in 4 working days. Above, right: a modern highway-access bridge over railroad tracks at North Branch, Maryland. There were 206 tons of steel involved—one double-plate girder span of 103 feet, and two beam spans (35 feet and 75 feet). Steelwork was erected and riveted in four working days by the American Bridge construction team.

Weight and maintenance problems solved

by reflooring old bridge with



AmBridge I-Beam-Lok



The bridge over the West Branch of the Susquehanna River in Clearfield, Pa., has been in continuous use for almost a half century. Its old wooden floor has been patched and resurfaced time and time again. Finally, it was decided to completely refloor the 280' long x 17'6" wide bridge with something permanent. But, switching to another type flooring would not be a simple matter, for existing 12" stringers were too light to carry any additional weight. In fact, it was desirable to lighten the flooring dead load, rather than increase it.

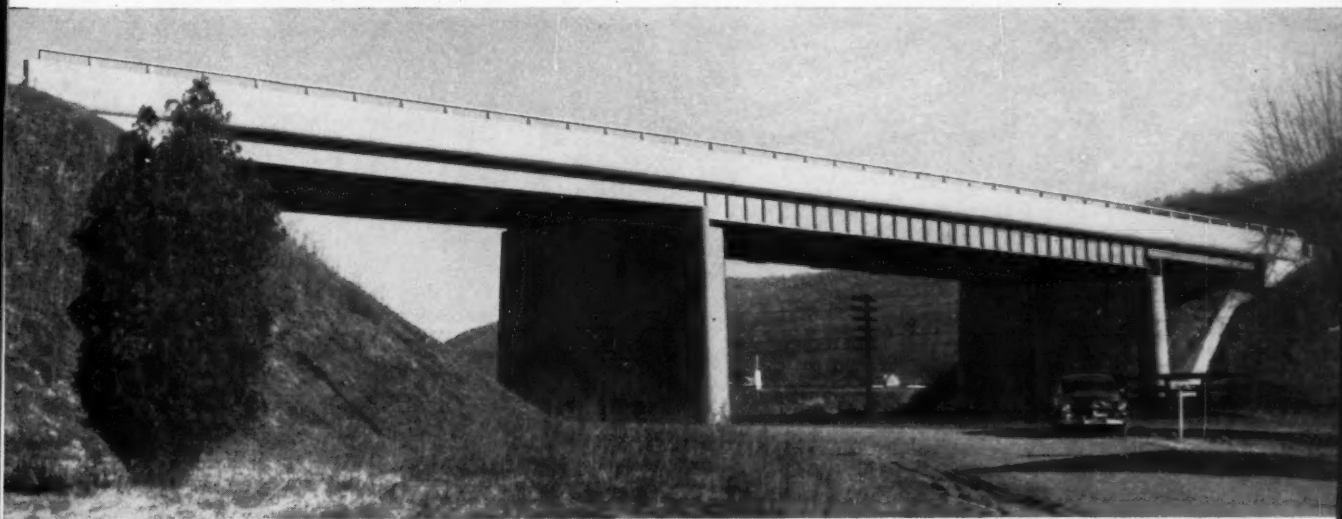
The problem was solved by using 5" open-type USS I-Beam-Lok. Weighing only 18.8 psf., this modern lightweight steel flooring was erected on the old stringers *without secondary supports*... a total of 4,894 sq. ft. (92,400 lbs.) of it being required for the roadway floor. I-Beam-Lok, being steel, also greatly increased the strength of the bridge and will considerably reduce upkeep and snow-removal costs.

The reflooring was done by the High Welding Company, Lancaster, Pa., I-Beam-Lok specialists.

For further information about the advantages of I-Beam-Lok, ask for a copy of our 32-page catalog.

USS, I-Beam-Lok and AmBridge are registered trademarks

Bridge helps you for the money!



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A Push in Reverse

Rubber-tired Michigan tractor mounts a 14-ft dozer blade up front and a pushplate in the rear. It can pushload the 25-yd Caterpillar scraper either in forward or in reverse, help it unload in gummy fill areas, and spread the fill. The versatile rig is working for Bennett Construction Co. on Interstate Highway 50 near Gardner, Kans.



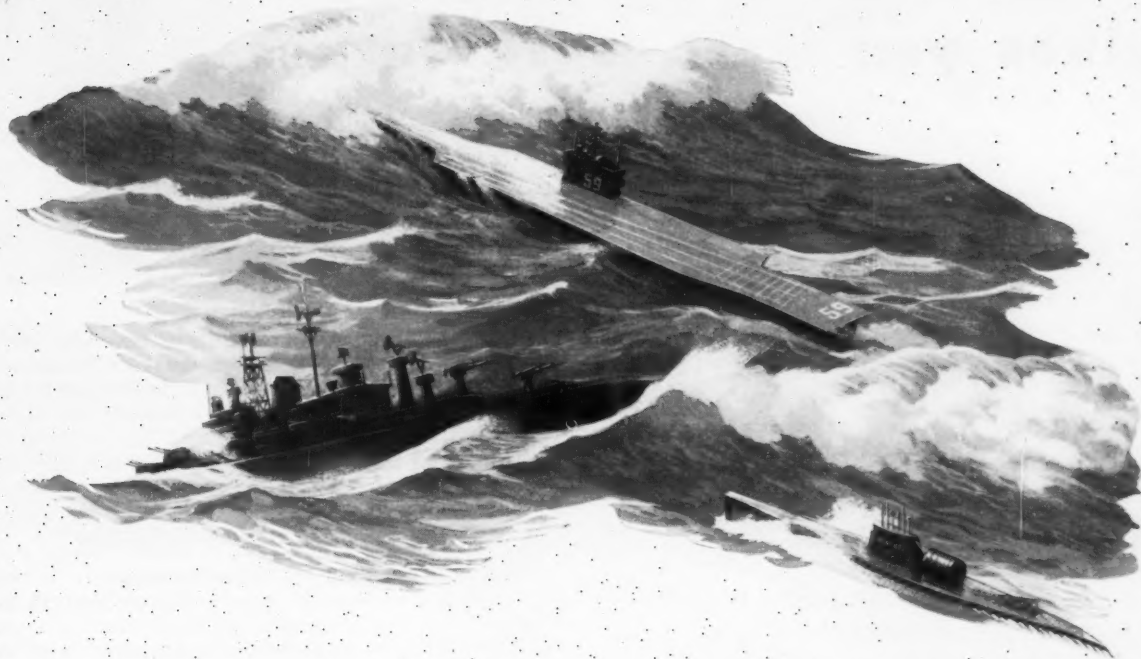
Topping Out

Last piece of structural steel goes into place on a 28-story office building in Oakland, Calif., that will be the main unit of the \$45-million Kaiser Center. Headquarters for the Henry J. Kaiser enterprises, it will be the largest office building in the state. General contractor is Robert E. McKee.



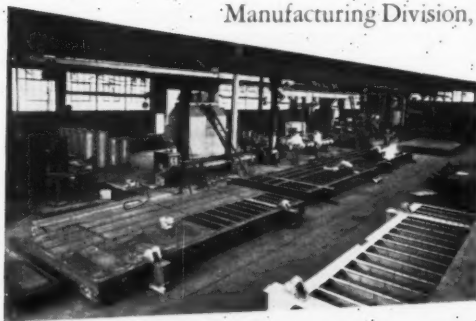
Troublesome Tunnel

Effluent outfall tunnel of the Los Angeles Hyperion sewage treatment plant runs through areas of unstable soil. Armco Drainage and Metal Products, Inc., subcontractor for this section, holds liner plates with trench jacks until each successive ring is completed. At the face, a crew pumps in a chemical soil solidification compound.



Storms a la carte

The 5-ton wave-generating weldments in the new David W. Taylor Model Basin, Carderock, Maryland, were made by the Butterworth Contract Manufacturing Division, under contract with Blount Brothers Construction Co., Montgomery, Alabama, general contractors.



In addition to testing the seaworthiness of ships, the model basin will also be used to simulate shore conditions and test landing craft. It's a U.S. Navy project.

Shown at left is a Butterworth production bay where the weldments were produced. Big, rugged, yet maximum over-all tolerances of 1/16-inch were maintained throughout as components had to be precisely located in the welding fixture. Machining tolerances on some parts were held to plus or minus .0005".

The modern Butterworth plant and our complete metalworking facilities are available to serve you. Talk to a Butterworth sales-engineer, or write for illustrated booklet, "The Butterworth Story."



BUTTERWORTH

Division of VAN NORMAN Industries, Inc.

Metalworking for Industry Since 1820

H. W. BUTTERWORTH & SONS COMPANY • BETHAYRES, PA.

Built-in **GO-power** gives you more work-output per dollar invested

Seven fast, powerful L-W Adams* model graders —

190 hp¹ 160 hp 135 hp¹ 123 hp 115 hp 80 hp 60 hp

¹with POWER-Flow[®] torque-converter drive

You buy a grader for *one reason* . . . **PROFIT!** To earn top profit on your investment, your grader must have the *GO-power* to produce more work in less time.

L-W Adams model graders give you more "go," more *useable* power . . . extra work-output per unit, compared to other graders. Size for size, they provide widest selection of "just-right" power-speed combinations . . . more transmission-gear choices for working, maneuvering, traveling . . . always at fastest practical rate.

15 speeds to match power to load

Fast-blading LeTourneau-Westinghouse graders with standard transmission give you more gear-ratios in the normal work-range, so you can always grade at or very near full-rpm engine-power. On most jobs your L-W can cut deeper, push more dirt, move it faster. Grader completes each task sooner . . . has spare time to handle extra work every day. Heavy-duty, 80 to 160-hp L-W Adams graders afford you 15 full-power speeds . . . 8 forward, 4 reverse, 3 (optional) creepers. 60-hp utility Model 220 is also tops in its class, with 10 full-power speeds, including optional creepers.

Full-hp "muscle" at all speeds

POWER-Flow drive on 135-hp and 190-hp L-W Adams models lets you apply full-hp push-power at any speed . . . even from a dead stop! Torque converter and con-

stant-mesh transmission provide the effective work-power of *infinite* gear-ratios in 4 speed-ranges, both forward and reverse. This gives you maximum thrust for starting the load . . . lets you accelerate quickly to blade dirt just as fast as *full engine-power* can move it. That's one of the main reasons why POWER-Flow graders give you more work-output than other graders of similar size and power.

Time-savings add extra output

The resulting big output becomes even bigger, because L-W graders waste less time in travel, turn-arounds, and positioning. These Adams machines move job-to-job, and between work assignments, faster than other graders (to 27.4 mph). And on one-way blading, your L-W makes more "passes" per hour, because it can back-up faster than other-make graders . . . 2 to 4 times as fast.

Bonus push-power

L-W heavy-duty graders deliver a greater proportion of developed engine-power to tandem-wheels. You get extra push-power because all gears and shafts in transmission, final drive, and tandems, turn on anti-friction bearings. Very little horsepower is lost thru friction. A larger percentage of engine power is made available as extra blade-thrust . . . extra *GO-power* to complete heavy work faster.

ASK FOR DEMONSTRATION

We'll be glad to arrange it! You'll see for yourself the extra profit potential that Adams *GO-power* will add to your fleet. Call or write for complete facts and figures.

TEXAS: At work for Claude Robinson, Borger, Tex., L-W Adams 550 grader smooths and levels oilfield drill-site, near Lipscomb. Grader prepared drill-site and also built 600' dirt access road, all in less than one-half day.





VIRGINIA: "There's no question about it, the Adams has plenty of real work-power," says P. C. Goodloe, Fredericksburg. Here contractor's Model 660 L-W grader cut side banks, preparatory to widening a city street.

VERMONT: L-W 60-hp Model 220 Adams grader handled all blade-work on regrading and blacktopping of this gravel road. "Our Adams does very good work ... we couldn't expect any more (from this-size machine)," says Owner Ralph Baslow, Ira, Vt.

CALIFORNIA: At 4.7 mph, L-W grader spread heavy blade-loads of base on this City of Oakland street, for Independent Construction Co., El Sabrante. Owner Wm. E. Craft reports "... best 'blade' ever, by any company."



ARIZONA: Torque-converter-equipped, 190-hp L-W POWER-Flow 660 grades tough volcanic cinder at high speed, for Copper State Constr. Co., Mesa. "Best grader on the market... moves more dirt, and faster," says Owner Link Colvin.



*Trademark G-1918-DC-2



LETOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit



DIGS and DUMPS *in a Hurry*



- UNIT in a gravel pit is always "in there swinging" ... piling up big payloads ... earning PROFITS!

The machine cuts away for a healthy load, swings and dumps in a hurry.

Owners like the ease of operation and the **FULL VISION CAB** for complete visibility.

They also like the sturdy construction, economical performance and low upkeep which all add up to earning power. Why not investigate what **UNIT** can do for you — on your next excavating and material handling job? Write for literature.

UNIT CRANE and SHOVEL CORP.

6305 W. Burnham St., Milwaukee 19, Wisconsin, U.S.A.

A8-5019

Business Ethics

MORE THAN FOUR YEARS AGO, the Associated General Contractors of America endorsed an Invitation to Bid form. It included a pledge that the general contractor, asking for a quotation from a subcontractor, "intends to conform to the letter and spirit" of AGC's Code of Ethical Conduct.

An excerpt from the code is printed on the invitation. It declares, "Ethical conduct with respect to subcontractors and those who supply materials requires that:

- 1. Proposals should not be invited from anyone who is known to be unqualified to perform the proposed work or to render the proper service.**
- 2. The figures of one competitor shall not be made known to another before the award of the subcontract, nor should they be used by the contractor to secure a lower proposal from another bidder.**
- 3. The contract should preferably be awarded to the lowest bidder, if he is qualified to perform the contract, but, if the award is made to another bidder, it should be at the amount of the latter's bid.**
- 4. In no case should the low bidder be led to believe that a lower bid than his has been received."**

Unfortunately, these noble business principles have not been followed by all contractors. Bid shopping and bid peddling are still far too common, to the detriment of all concerned. And most people in the industry agree that legislation is not the answer to the problem.

Awhile back, however, the San Diego chapter of AGC instituted a new scheme to try to eliminate bidding evils. Adaptations of the plan are spreading throughout the country. Basic feature of these plans is that the general contractor's will not accept subs' quotations after a certain specified time—usually four hours—prior to prime bid filing.

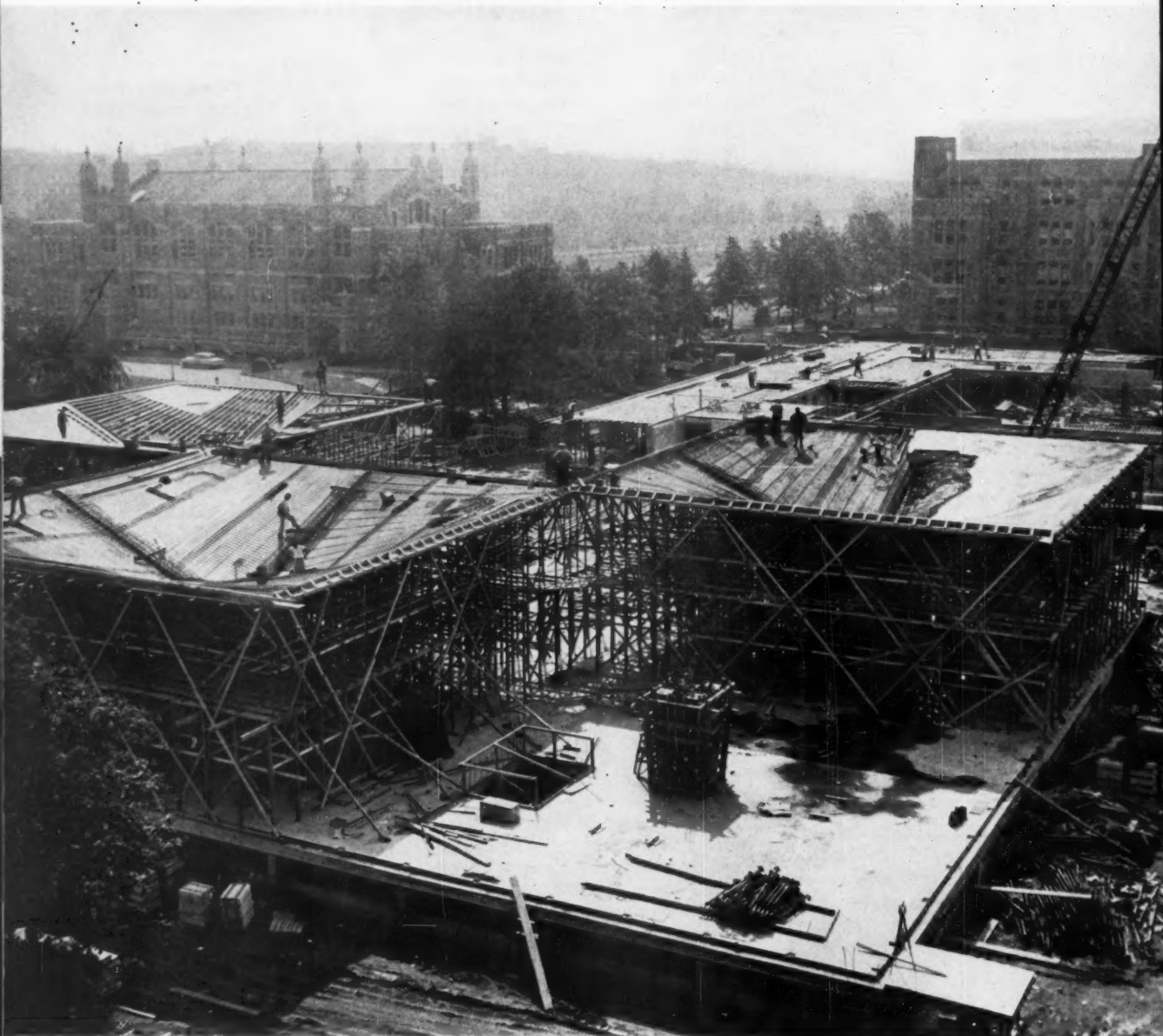
On the surface, this interval would seem to give the parties concerned more time to shop around. But the plans include provisions as to what general and sub can and cannot do. And they are usually policed by joint committees of contractors, subcontractors, and suppliers.

Anyway, the plans seem to work. Contractors like them, because they are less rushed in finalizing their bid figures. The chance for bidding errors thus is reduced, with consequently less need for a high contingency. And the subcontractors feel the generals give them a better shake.

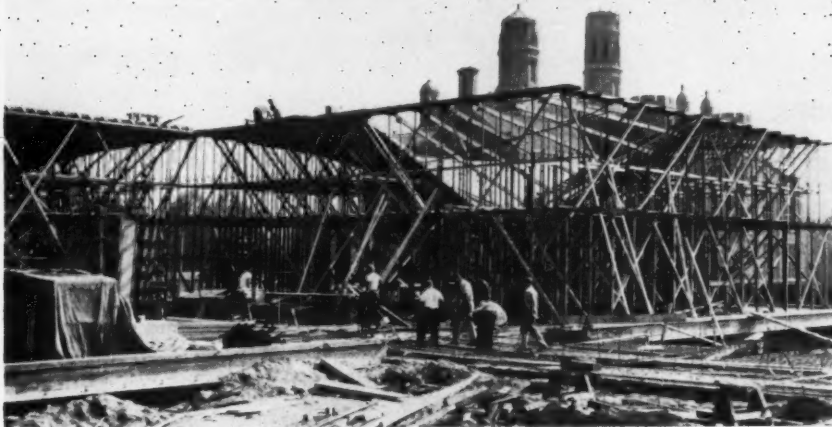
But the question is, "Will this sweetness and light continue?" The behavior provisions of the plans are similar to, but more detailed than, those in the subcontractor section of AGC's Code of Ethics. It can only be hoped that they will be followed more faithfully than those were.

Standard Plywood Panels Form Curved Thin-Shell Roof

These hyperbolic paraboloid roof sections curve in two directions, but all it takes to form them is ordinary 2x8-ft plywood panels. When the panels are properly spaced, it's not even necessary to clamp them in place.



CENTER COLUMN SUPPORTS EACH OF SIX STRUCTURALLY INDEPENDENT HYPERBOLIC PARABOLOID ROOF SECTIONS.



TWO-LEVEL FALSEWORK—Adjustable metal shores that hold plywood roof panels stand on 12-ft-high timber frame. Both shores and 4x4 timber posts beneath are on 4-ft centers.

By RICHARD GUILMENOT
Dic Concrete Corp.
Elmont, Long Island

TOUGH FORMING JOBS that call for a lot of slick carpentry are the ones that I always seem to pull. But I'm not complaining. I like jobs that are off the beaten path, and so do my men. We all get a kick out of doing something different.

This job we're working on now is certainly different enough to satisfy anybody. We're building a library on the campus of Hunter College in New York City. It's made up of six thin-shell concrete sections that resemble inverted umbrellas. Each section is a hyperbolic paraboloid that curves downward from its outside edge to a supporting column in the center.

The umbrellas are 60 ft square. They cover a floor area that measures 120x180 ft. Structurally, each of the six roof sections is independent; but a key cast into the shell at the edges fits them together. Thickness of the shells is 3½ in., except at the edges where it increases to about 5 in.

Cross-shaped, the columns are 4 ft across in both directions at the bottom, and taper out to an overall width of 5 ft, 4 in. at the top. Width of the arms of the cross is 14 in. Stiffener ribs branch from each arm at the top of the column, 9 ft above the floor, and run along the ridge lines separating the umbrella into four sections. The depth of the ribs varies from 30 in. at the column to 8 in. at the roof. Width is 14 in. along the entire length of each rib. Height of the umbrella at the flat roof line along each edge is 22 ft above floor level.

Actually, it looks a lot tougher than it is. The umbrellas look as

curvaceous as Brigitte Bardot. But, strangely enough, the hyperbolic paraboloid surface can be formed entirely with straight pieces of lumber. We got away with using standard 2x8 plywood panels, and didn't even have to clamp them down in spite of the warp in the surface.

Difference in elevation across the 2-ft width of the panels never is more than 3 in., so there's no problem in bending the thin sheets to conform to the curved surface. A thin sheet of plywood—we use ⅝-in. stock—will assume this much warp naturally under its own weight when placed in proper position.

We left a small gap along the sides of the panels to take care of the warp. The gap is only ¼ in. near the outside edge, but it increases gradually to a maximum of about 2½ in. where the stiffener ribs meet the column. Pieces of scrap plywood close off the bottom of the gap. Later, when the narrow crack is filled with cement grout, the ridges protruding from the underside of the shell accentuate the curvature of the umbrella roof. So, besides helping us fit the panels to the curved surface, the gaps create a striking architectural effect.

Trick Pays Off

Just to make sure that the carpenters would have a good idea of what they had to do on this job, I pulled a little trick on them that really paid off. During the winter I built a small scale model of a hyperbolic paraboloid and left it in the carpenters' shack for the boys to stumble over when they went in to change clothes or eat lunch.

I think it helped them get acquainted with the problems they would face when the weather

broke and we started erecting forms. In spite of the fact that none of them had any experience on this type of structure, they didn't have much trouble once they got going.

In designing the forming setup, we first considered a traveler arrangement. We hoped to devise a single set of forms to do the entire job. But we finally gave up on the idea simply because there was not enough floor area to move around in. Instead, we decided on a conventional falsework system to support the forms.

The carpenters constructed forms for three umbrellas, setting them up on the floor slab of the one-story building in a checkerboard pattern. We reused each set once to form the alternate sections that were skipped the first time around. Before starting on the roof, we formed and poured all six columns at the same time.

The two-level falsework supporting the plywood sheets consists of a timber framework and adjustable metal shores. The framework that supports the shores consists of 4x4-in. timber posts on 4-ft centers, braced horizontally and diagonally by 2x4's, and topped with 4x6 plates.

This timber frame is 12 ft high. On it stand the Acrow shores that hold the forms. The shores are also spaced 4 ft each way. Spanning between the shores are 4x6 wood stringers that support the 3x4-in. ribs. Joist spacing varies slightly because of the curvature of the shell, but averages 12 in.

A 20-man carpenter crew can erect the forms for one roof section in about two weeks. The cost of forming on this job averages out to around \$2.25 per sq. ft.

With forms for the thin shell umbrella in place, next step is



FILLING THE GAPS—Grout fills space left between panels to take care of warp.

FORMING CURVED THIN-SHELL ROOF... continued

placing the reinforcing steel. Twelve mats of welded wire fabric form the principal reinforcement of each umbrella. The mats are 31 ft long, 10½ ft wide. They consist of #5 gage wires spaced 6 in. each way. Each mat weighs 700 lb. Total weight of fabric reinforcement in each umbrella is 4.2 tons. In addition, reinforcing bars strengthen the stiffener ribs and tension edges of the shell.

A 20-ton truck crane lifts the mats from a stockpile adjacent to the building up to the lather crew waiting on the roof. The workmen place the mats carefully in parallel rows, tying them down securely to 1-in.-high chairs. They start at the center and work out towards the edges to avoid bulging of the mats.

Mats overlap along their length by two wire spacings, or 1 ft, on each side. At the lap, the steel crew arranges the mats so there are no more than three thicknesses of wire on top of each other. This provides at least 1 in. of con-

crete cover at top and bottom of the shell.

Finally, excess at the ends of the mats is trimmed off to make them fit the curved surface perfectly. Mats at the center, where the draped length is 31 ft, do not have to be cut; but, approaching the edge, progressively more must be sliced from each mat. The four-man lather crew completes placing of all reinforcing for an umbrella in 10 to 12 hours.

We chose fabric reinforcing over conventional bar reinforcing, in spite of its slightly higher cost, because of the savings offered in time and labor.

Pouring Concrete

Concreting of the umbrellas is a simple, straight forward operation. Our 14-man crew pours the 60 yd of concrete in each umbrella in less than 8 hr, and they could do it much quicker if concrete delivery from the plant was faster and more reliable. The special mix, called Lelite (weight 108

lb per cu ft), arrives at the site in transit-mix trucks. The trip from the plant takes about 25 min. A truck crane with 1-yd. bucket transfers the concrete from the trucks to the roof.

The concrete crew places the mix in one quadrant of the square umbrellas at a time, working from the top down towards the center. Specs limit slump of the concrete to a maximum of 2 in. to prevent excessive running of the mix on the sloping forms. A small amount of Plastiment retards setting of the concrete and prevents formation of construction joints in the shell.

Just before the pour, a workman fills the gap between form panels with grout. Size of aggregate in the concrete ruled out filling the narrow opening during the pour. After dumping the concrete, the crew spreads and vibrates it, concentrating on the deeper sections along the stiffener ribs. Then the finishing crew levels the freshly poured concrete with a short wood screed, leaving a rough finish to aid bond with the final layer of insulating concrete. Finally a workman sprays a chemical curing compound over the fresh concrete.

We strip the plywood forms after 10 days. Forms for the stiffener ribs are left in place, supported by several shores, and a row of shores remains in place along each outside edge of the umbrellas until the entire roof is complete and all concrete reaches design strength of 3,800 psi. Guy wires strung from the exterior corners of the umbrella and anchored to the floor slab brace each section against possible uplift from wind action.

Later a 3-in. layer of Perlite concrete will cover the structural roof slab. The insulation provided by the mixture of mica and cement will be equivalent to 30 in. of concrete. Finishing off the roof will be strips of mineral surface roofing, laid in alternate rows of light and dark grey.

General contractor on the \$3.3-million Hunter College project, which includes a large classroom building as well as the library, is Leon D. DeMatteis & Sons Co., of Elmont, Long Island. Project superintendent for DeMatteis is Bernard Robertson. Resident engineer for the New York City Board of Higher Education is Jerry Furst.



CONCRETING—Crew places concrete in one quadrant of roof section at a time, starting at the edge and working down towards the center. Concrete is special lightweight mix.

Barge-Mounted Shovel Makes Efficient Dipper Dredge



COMPLETED DREDGE—Contractor-built dredge removes blasted rock from Welland Canal bottom. Shovel is a Manitowoc 4500 with

modifications to boom and a specially built dipper stick. Large A-frame built on barge, replaces smaller one normally on shovel.

A Canadian contractor, who wanted a dipper dredge in a hurry, put together his own in a fraction of the time it would have taken to get a conventional rig built. He adapted a standard 5½-yd shovel to work from a specially built barge and ended up with a highly versatile rig.

BUILDING A DIPPER DREDGE is a job that even an experienced do-it-yourself contractor would hesitate to tackle. Most dredging contractors have their machines custom-made by a manufacturer who knows what he is doing. But one enterprising Canadian outfit put together its own 5½-yd dredge. And they like it better than a "store-bought" rig.

Actually they did get some help

from an experienced manufacturer—the Manitowoc Engineering Corp.—which modified one of its 4500 shovels for the job. But the contractor, Russell Construction Co. of Toronto, Ont., Can., took it from there. They designed and assembled a unique and highly effective dredge that outperforms many conventional dredges.

Mounting certain types of equipment on barges is nothing

new. Russell has done it before with clamshells, draglines, and cranes. But mounting a shovel on a barge to act as a dipper dredge is not common, and it takes considerable ingenuity.

Seaway Contract

Russell built the rig this year for their contract to deepen sections of the Welland Canal to meet St. Lawrence Seaway re-

BARGE MOUNTED SHOVEL MAKES EFFICIENT DIPPER DREDGE... continued

quirements. It has been handling this work successfully since June, when it first went into action.

There are a number of reasons why Russell is pleased with the rig.

- It took them only three months to build it. They would have had to wait a year for a conventional machine.

- The initial cost of the shovel and hull was lower than conventional dredges. Maintenance costs less, too, because parts are standard.

- The shovel is easier to operate, and it has a faster cycle. On regular dredges the main operations require several men. But with the shovel, one man handles all controls from the cab. And shovel operators are easier to find than experienced dredge men.

- The shovel may be converted to clamshell, dragline, or lift-crane for maximum versatility. This would not be possible with a standard dredge.

Building the Barge

The first thing Russell needed was a suitable barge to carry the shovel. They had one built specially by a local shipbuilder, Port Weller Dry Dock Ltd., of Port Weller, Ont.

The barge is 120 ft long, 50 ft wide, and it weighs just over 700 tons. It is 9 ft deep at the front end, 7 ft deep at the back end. These depths were figured so that, with the shovel mounted on front, a minimum of ballast is needed at the rear to make the barge float level.

Three spuds, fabricated of 1-in. steel plate, were built into the barge. The front vertical spuds are 4-ft square box sections 65 ft long and weighing 35 tons. The stern walking spud is 36 in. square by 65 ft long and weighs approximately 30 tons. The spuds are raised and lowered by cables passing over sheaves at the top and near the bottom of the spuds. The sheaves on the tops of the spuds are 68 in. in diameter.

In place of the usual direct drive by diesel, electric, or steam engine, the spuds are powered diesel-hydraulically. The winches operating the spuds are pow-

ered by hydraulic motors with two diesel engines supplying the hydraulic fluid under pressure to the hydraulic motors. The winches, diesel engines, and hydraulic pumps are mounted below deck and are arranged so that, in the event of mechanical difficulty, the starboard winches can act as standbys for the port winches and vice versa. This power mechanism slips under any overload and provides smoother and more dependable operation.

Russell also arranged to have the spud motors controlled from the cab of the shovel. Thus the shovel operator can start and operate the spuds without leaving the cab or requiring extra help from the crew. This is accomplished by electrical solenoid controls with push buttons in the cab.

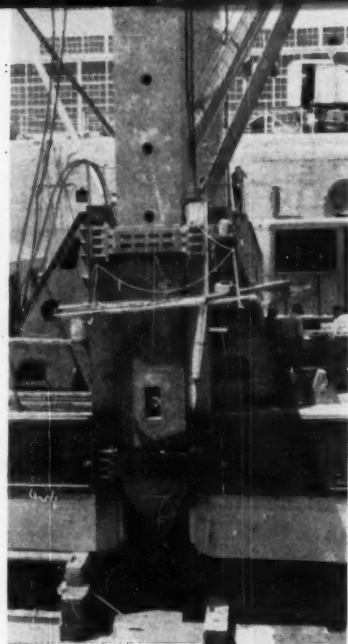
Automatic relays in the hydraulic system vary the speed of travel of the spuds with the resistance to movement, giving additional power when required, as when pulling the spud out of the mud, and extra speed when the spud travels freely.

Adapting the Shovel

Manitowoc engineers, after consulting with Russell, made most of the major changes in the shovel before it left the factory. They used a standard 60-ft shovel boom, the largest available for a 4500 shovel. But they changed the pivot point for the dipper stick.

They moved the point back toward the chassis end of the boom to reduce the dumping radius. This allowed the shovel to dump directly into a scow moored alongside the dredge. But they were careful not to move the stick back any farther than necessary so as not to limit unduly the digging radius. The stick was built specially to a length of 58 ft. The longest standard stick for a Manitowoc shovel is 45 ft.

Russell wanted a dual purpose boom that could be used for either a shovel or a clamshell-crane. Manitowoc achieved this by mounting a double set of sheaves on the upper boom point. The outer set is for the shovel;



SPUDS—Normal spud built into barge is box section formed of 1-in. steel plate.

the inner set is placed for clamshell or crane work. Each set is independent of the other.

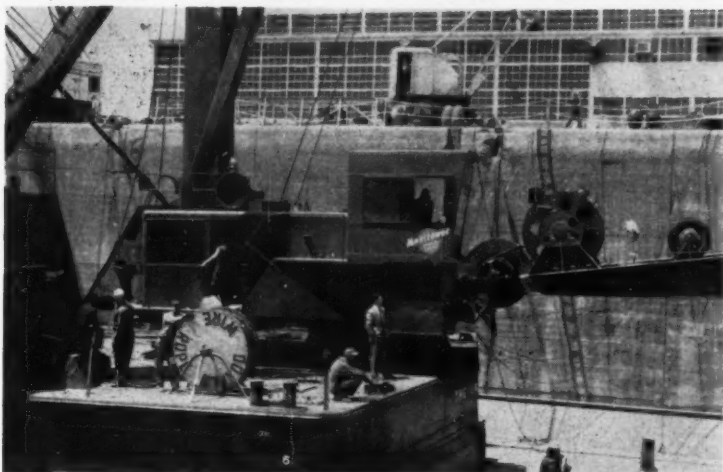
Another change was the replacement of the regular 450-hp engine with two 200-hp engines. One engine controls the boom hoist and swing; the second operates the dipper hoist.

Russell finds that this engine arrangement gives more economical operation than the one big engine because the power is directed only where needed at the moment.

When engaged in two operations, such as dipper hoist combined with swing, a single engine would run at the speed necessary for the faster of the two operations; the slower operation would be controlled by slipping the clutch, an inefficient method.

The two-engine setup allows for completely independent speed control on the various functions; clutches are never engaged under load, and friction surfaces stay cooler. The main controls function as both clutch and throttle controls. The first movement of the lever engages the clutch at low engine speed, and additional movement speeds up the engine as required. The result is smoother speed control and lower operating costs.

Of course the two engines require a double bank of controls in the cab. But Russell operators have been able to handle the extra manipulations with little trouble.



CAB ADAPTATIONS—Operators cab is enlarged to contain extra controls. Two 200-hp engines replace single 450-hp engine. Extra hoist drum on boom has been added.

Mounting the Shovel

The shovel is mounted on a cylindrical turret set into the deck of the barge. The turret is well braced against the bulkheads of the barge below decks.

Russell did not buy the undercarriage for the shovel at all. They plan to leave the rig permanently on the barge. The entire vessel is registered as a dredge.

A 60-ft-high "A" frame, mounted on the barge, takes the place of a standard "A" frame on top of the shovel. The shovel boom is supported from this "A" frame, relieving the mounting of considerable load and making it possible to handle a full 5½-yd bucket despite the length of the boom and dipper stick.

The padlock sheave that usually is on the bail bar of the dipper bucket was eliminated to avoid fouling and maintenance problems. Russell managed to do this by having an intermediate hoist drum located on the boom, near the boom base.

Water slows the normal pendulum fall of the dipper stick on the return stroke. Yet the dipper has to get far enough over the center so that the teeth can bite into the bottom on the digging stroke. A special haul-back winch, built into the shovel, provides the extra force necessary to pull the dipper stick back farther and faster. The haul-back line is attached to the dipper stick several feet behind the dipper, and the controls for the haul-back winch are incorporated in the op-

erator's cab.

In designing the haul-back winch, Russell had to satisfy three conditions. First, it had to have a fast line pull so as not to delay the shovel cycle. Second, it had to have enough power to pull the dredge during moves (when moving, they place the dipper ahead on the canal bottom and take up on the haul-back winch to pull the barge forward). And finally it had to take up slack in the cable automatically so as to be ready for action at all times.

There were several other minor additions. The cab on the shovel was enlarged to make room for the extra controls that went into it. Special winches were set around the decks to control the scows that carried away excavated rock, which predominated on the Welland Canal job.

Performance

Russell's dredging strategy on the excavation phase is to make two passes after the drilling and blasting is completed. With the 5½-yd dipper mounted, the dredge makes the first pass. It works fast, aiming for a maximum volume of rock moving. It doesn't try to cut right down to grade because it tends to overdig when it tries to cut too close.

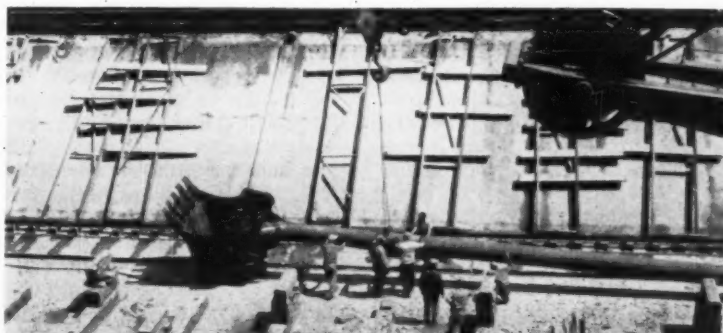
On the second pass a clamshell is substituted for the dipper. The clam has a capacity of 5 yd, but it is rarely filled. Its main function is cleaning up and shaping. Russell uses the large size because of the wide spread of its jaws. It can clean quite a bit of the bottom in one grab.

The 60-ft shovel boom is shorter than most clamshell booms but is ideal for this job. Long reach is not too important but good control and a fast cycle are.

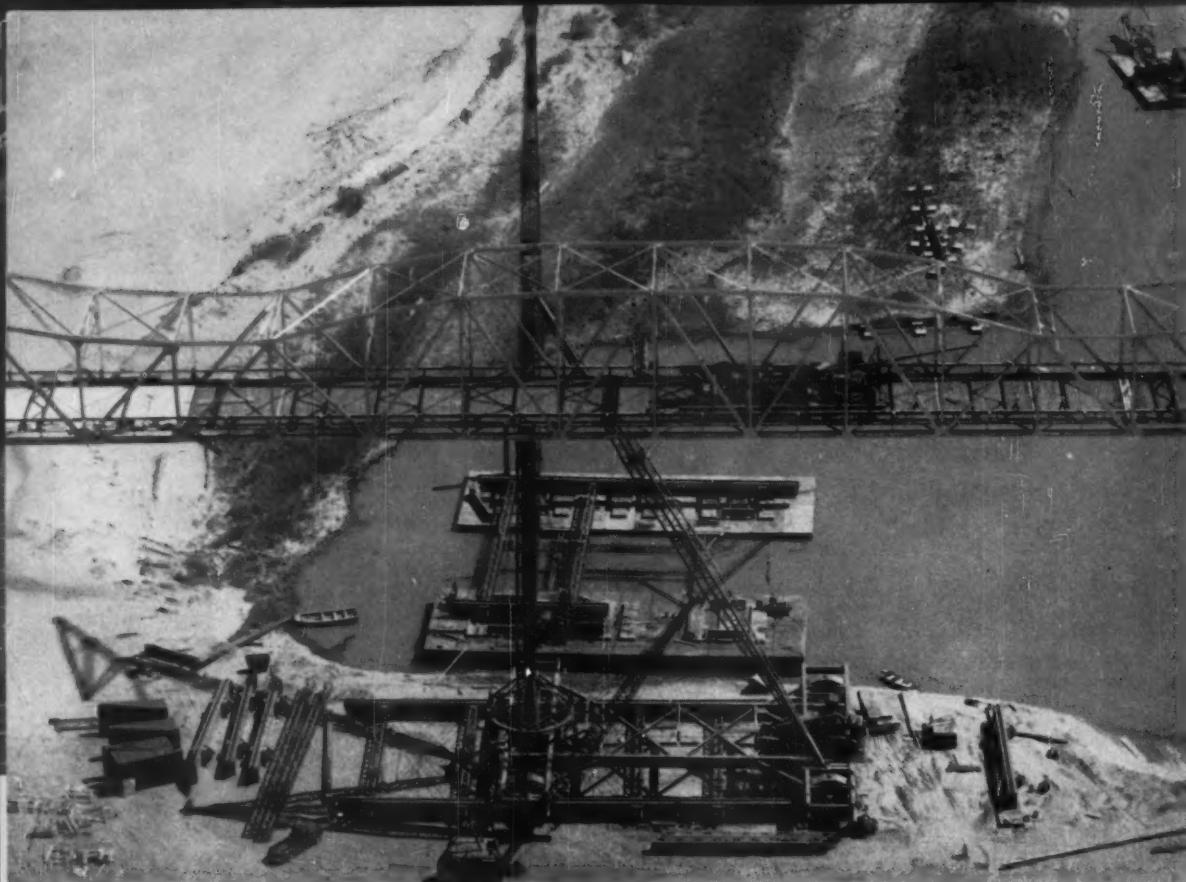
The shovel can dig to a depth of 35 ft although it now cuts to only 32 ft. It removes a 4-ft layer of blasted rock from the canal bottom.

It digs a 60-ft width with the present arrangement of scows (loading on one side only). It could conveniently handle an 80-ft swath if there were room to moor scows on both sides of the dredge so the shovel could load both sides without a long swing. The shovel is mounted so it can swing 120 deg to either side.

Bill Knox is superintendent on the job. M. A. Fine, design and estimating engineer, and Don Curtis, plant manager, were the two men primarily responsible for the design of the dredge.



BIG DIPPER—Manitowoc made this 5½-yd dipper specially for Russell. Tubular shaft lets it rotate in saddle. Operator dumps oversize rocks by deliberately tilting bucket.



TRAVELS WELL—Big rig's 250-ft. of boom and jib tower over Forest City span. For mid-river work, it travels on trackage to barge. Carriage and derrick weigh 450 tons.

Traveling Stiffleg Derrick Sets

Contractor eliminates overhead travelers and sets steel from the ground with big stiffleg derrick that handles 200 tons at 100-ft radius with its 200-ft main boom.

THE OLD AXIOM that says no two construction jobs are alike takes a beating on two South Dakota bridge projects. So does the idea that you can't leave big money on the bid table without getting hurt.

The bridges, which are virtually twins, cross the Missouri River at Forest City and Mobridge. They replace existing spans that will be drowned out when water backs up behind the Oahe Dam near Pierre, S.D.

Both projects are overshadowed as construction jobs by the mammoth \$380 million Oahe project, the world's largest rolled earth dam. But this obscurity is undeserved.

The new structures are the longest high bridges between the

Mississippi River and the West Coast. And they are just about the cheapest of their type to go up in a long while. The 4,853-ft Forest City Bridge, which was dedicated last month, cost \$36.33 per sq ft. The 5,050-ft Mobridge span, which will be opened next July, will cost \$31.15 per sq ft.

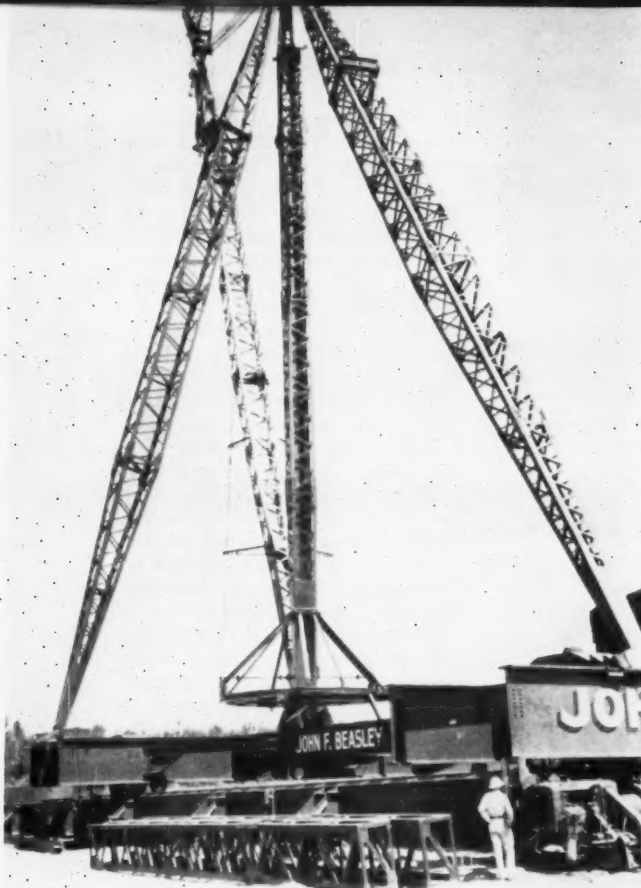
The John F. Beasley Construction Co. of Muskogee, Okla., superstructure contractor for both jobs, left \$900,000 on the table when they bid the projects. But they were not hurt at all. In fact, they called their shot by guessing in advance of the bid opening the amount by which they would undercut the field.

Beasley's idea was to erect the bridges from the ground—even though both of them are as high

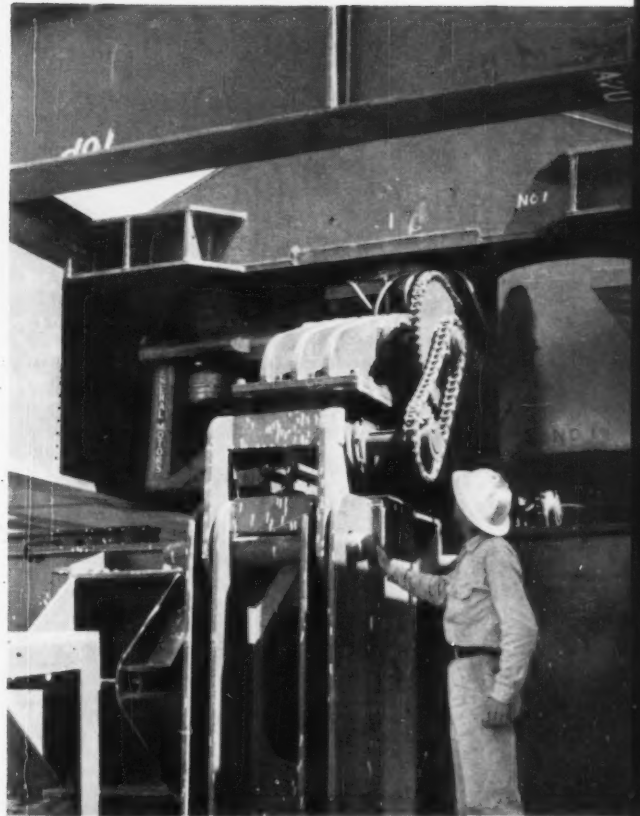
as 20-story buildings. This eliminated the need for an overhead traveler and the extra bracing, bolting, and falsework that would be required to carry the traveler's weight.

Because they did not carry a traveler, the main spans at Forest City were cantilevered as far as 225 ft before they were supported. And then, instead of elaborate falsework, the supports were four pre-fabricated bents that were moved easily from one setting to another.

The rig that enabled Beasley to set steel from the ground at Forest City is a huge traveling stiffleg derrick worth \$500,000. It has a maximum lifting capacity of 200 tons at a 100-ft radius with its 200-ft boom. Its jib, which



HEAVY CARRIAGE—Girders with 5-ft webs, 2-ft flanges form carriage. Dollies beneath carriage ride on rails set on massive trackage.



MOTIVE POWER—Two diesels power carriage through chain and sprocket hook-ups to dollies. Bracket joins 52-sq-ft trackage sections.

High Bridge Steel

goes up another 50-ft, carries a 50-ton belly line and a 25-ton whip. The boom swings through 273 deg, and its capacity remains constant at any point of swing.

The stiffleg is rigged with 6,000 ft of 1½-in. cable that works through a five-drum American hoist powered by a Cummins NHRPH diesel with a Twin Disc torque converter. The main falls have 28 parts, and each main block has 13 sheaves. The main blocks alone weigh seven tons.

The trackage on which the derrick travels—plus the four support bents—weigh more than the structural steel going into each bridge. The rig is so big that a network of telephones had to be installed so that operators could communicate with each other.

The stiffleg mounts on a 115-ft-long, 82-ft-wide carriage built from welded girders with 5-ft webs and 2-ft flanges. The carriage and derrick weigh 450 tons.

Dollies beneath the main carriage ride on dual railroad rails set on a massive trackage. To change the direction of travel of the carriage, the frame is jacked up and the dollies are swung 90 deg. Two General Motors 3-71 diesels with Twin Disc torque converters power the carriage through a chain and sprocket arrangement that connects to the dolly wheels.

The trackage is built in 52-sq-ft sections that weigh 56 tons each. Welded from 1-in. plate, rail-supporting girders have 5-ft double webs and 2-ft flanges. Transverse bracing between girders consists of two 2x3-ft struts made of welded angles. These are inset 12 ft from the girder ends.

Enough trackage is available for the stiffleg to travel 400 ft. After it moves over a 52-sq-ft section, it simply picks up the trackage, swings it forward, and places it on sills. Sills are 12x12-

in. oak timbers bolted together in 12x12-ft mats.

The stiffleg, which can climb grades up to 6 deg, traveled from the approach of the Forest City Bridge to the water line. It also walked itself onto a barge and placed steel from mid-river. To get it on the barge, the rig was taken down to the river bank sideways on tracks set 96 ft apart. At the water's edge it was turned 90 deg and moved onto the barge on tracks set 52 ft apart.

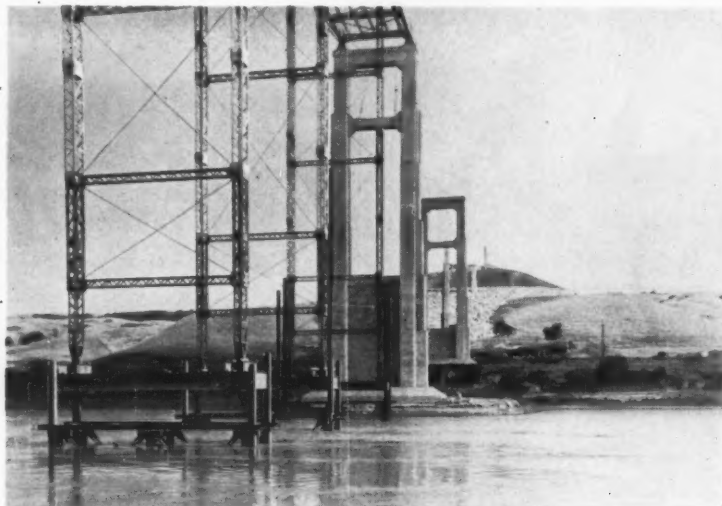
The barge used for mid-river work was built from a number of 10x20-ft pontoons. These were assembled into two 40x120-ft units that were held 40 ft apart by struts.

Two big crawler-mounted cranes assisted the traveling stiffleg with the steel work at Forest City. These were model 3900 Manitowocs fitted with 200-ft tubular steel booms and 30-ft jibs.

The main advantage of working from the ground with the stiffleg and long-boom cranes was that it eliminated extensive falsework to support an overhead traveler. Instead, Beasley used four pre-



BIG REACH—Manitowoc crane (right) with special 200-ft tubular alloy steel boom and 30-ft jib sets steel. Movable pre-fabricated bents set on grillage support span.



EASY TO MOVE—Bents are moved as a unit from one grillage to another in half an hour by stiffleg derrick. Each carries 200-ton load. Bottom sections are jacking legs.

TRAVELING STIFFLEG DERRICK... continued.

fabricated bents built up from steel angles. Each bent and its load was supported on a grillage that was bolted to piling.

The bents are two-legged, guyed and struttled, 10 and 20-ft sections that can be run up to a maximum of 170 ft. Each leg is designed to support a 100-ton load. So that they can be used at various heights, the bottom sections are jacking legs that telescope $9\frac{1}{2}$ ft. A W.S. Pine hydraulic jack makes the adjustments in 6-in. increments.

The 14-in. WF piles supporting the grillage are driven to a template to assure accuracy. Four piles support each grillage. The bents, which are picked up and moved as a unit by the stiffleg derrick, can be transferred from one grillage to another in half an hour.

The substructure contractor for

both bridges, the Massman Construction Co of Kansas City, benefited from the twin-bridge design. The most important savings was from using the same forms on both jobs. This was no accident. For the Forest City piers, Massman reinforced the plywood liners with steel and 6-in. timbers so that they could do double duty.

Piers for both bridges were poured in a cruciform design in 24-ft lifts. Each lift narrowed down in length and width until the pier formed a rectangle by the time the last lift was poured. It was a simple matter to remove 1 ft from the forms after each lift so that they could be used repeatedly.

The substructure contractor also saved money by building the 17 piers for the Forest City Bridge and the 21 for the Mobridge span without cofferdams (CM&E, Aug.,

p. 94). Instead a subcontractor, Ace Construction Co. of Omaha, Neb., blocked off four-fifths of the Missouri River channel with two earth dikes, and the piers were built in the dry. At Forest City, piers were set on H-piling driven 140-ft deep by a 30,000-ft-lb steam hammer. At Mobridge, piling was driven to a maximum depth of 115 ft by a 30,000-ft-lb diesel hammer.

South Dakota helped itself keep within its estimates, too. The bridges went out for bids at a time when steel prices and supplies were erratic. So the state bought and stockpiled more than \$800,000 worth of piling for the bridges. As a result, there was no uncertainty on the contractors' part when it came time to bid.

Because lightweight aggregate was specified for the bridge decks, overall weight was cut substantially. This allowed a cutback in the amount of steel required. On the Forest City job the use of lightweight aggregate shaved the weight of the deck by 3,000,000 lb; on the Mobridge span, weight will be reduced by 3,300,000 lb. The use of lightweight aggregate and the absence of overhead travelers allowed the contractors to use the bents for support.

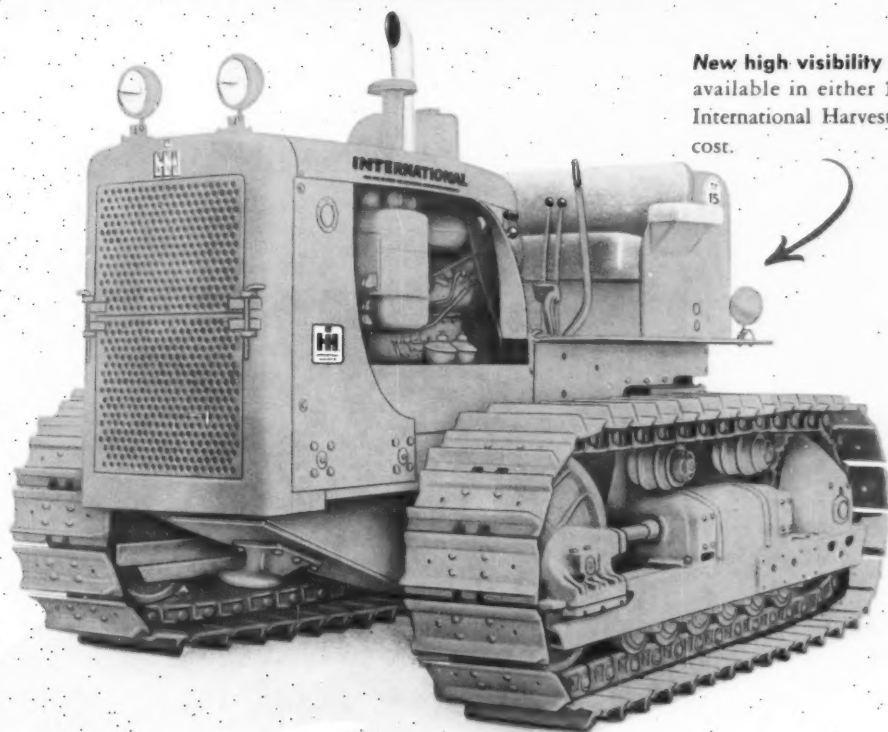
The only difference between the two bridges is their length, and most of this is accounted for at the approaches. On both bridges, the main span is two 125-ft cantilevers with a 250-ft hanging span. This cut costs because it permitted the steel fabricator, Vincennes Steel Division of Industrial Enterprises, Inc., to repeat the same design when they fabricated the superstructure members.

Beasley's big traveling stiffleg derrick last worked on a bridge job at Ecorse, La., where it was fitted with a shorter boom. (CM&E, May, p. 67). After it finishes the Missouri River bridge project it will be broken down and moved out by rail. Beasley hasn't got a new job spotted for it yet, but one thing is sure—on this job it more than earned its keep.

Beasley's superintendent for both the Forest City and Mobridge projects is J. W. Fitzgerald. K. R. Scurr is bridge engineer for the South Dakota Department of Highways and Roy W. Johnson is chief designer for the Department's Missouri River Bridge Section. Consulting engineers were Kirkham-Michael Associates of Omaha, Neb.

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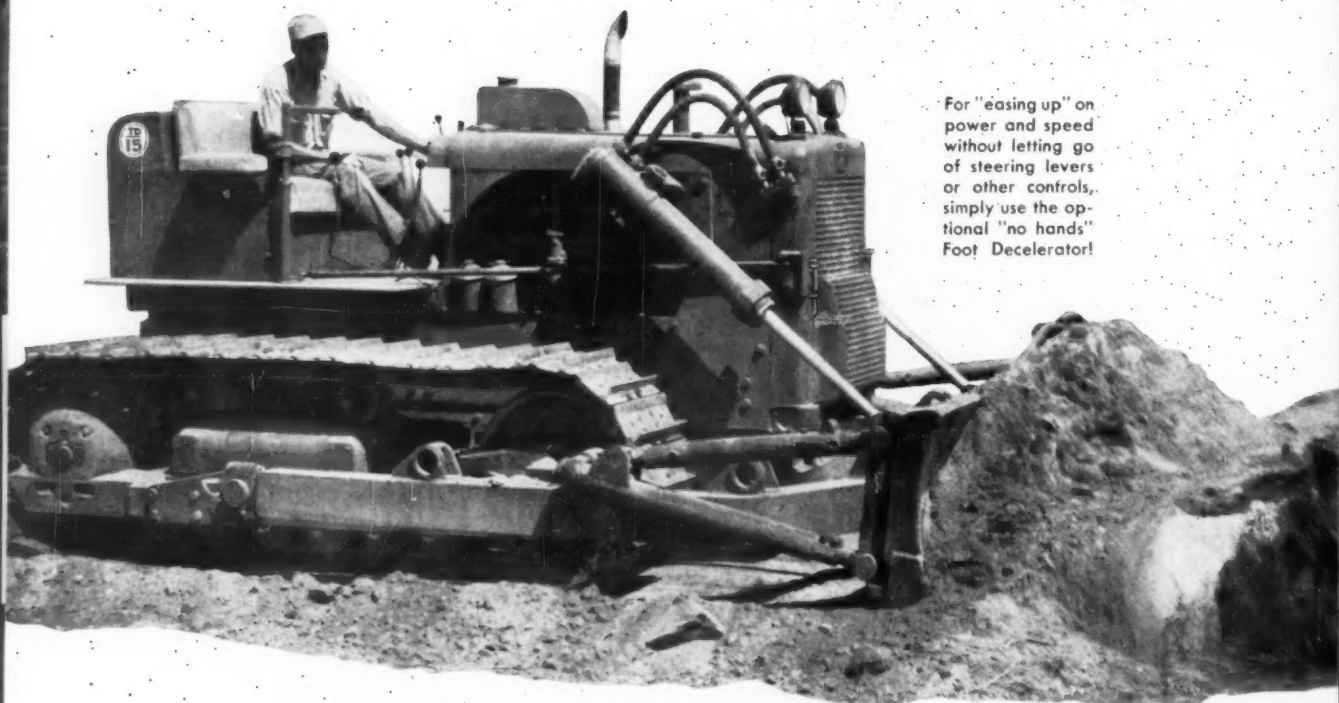
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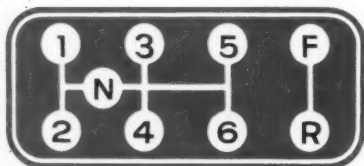
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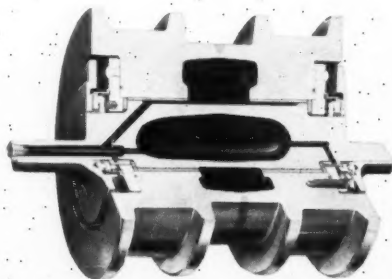
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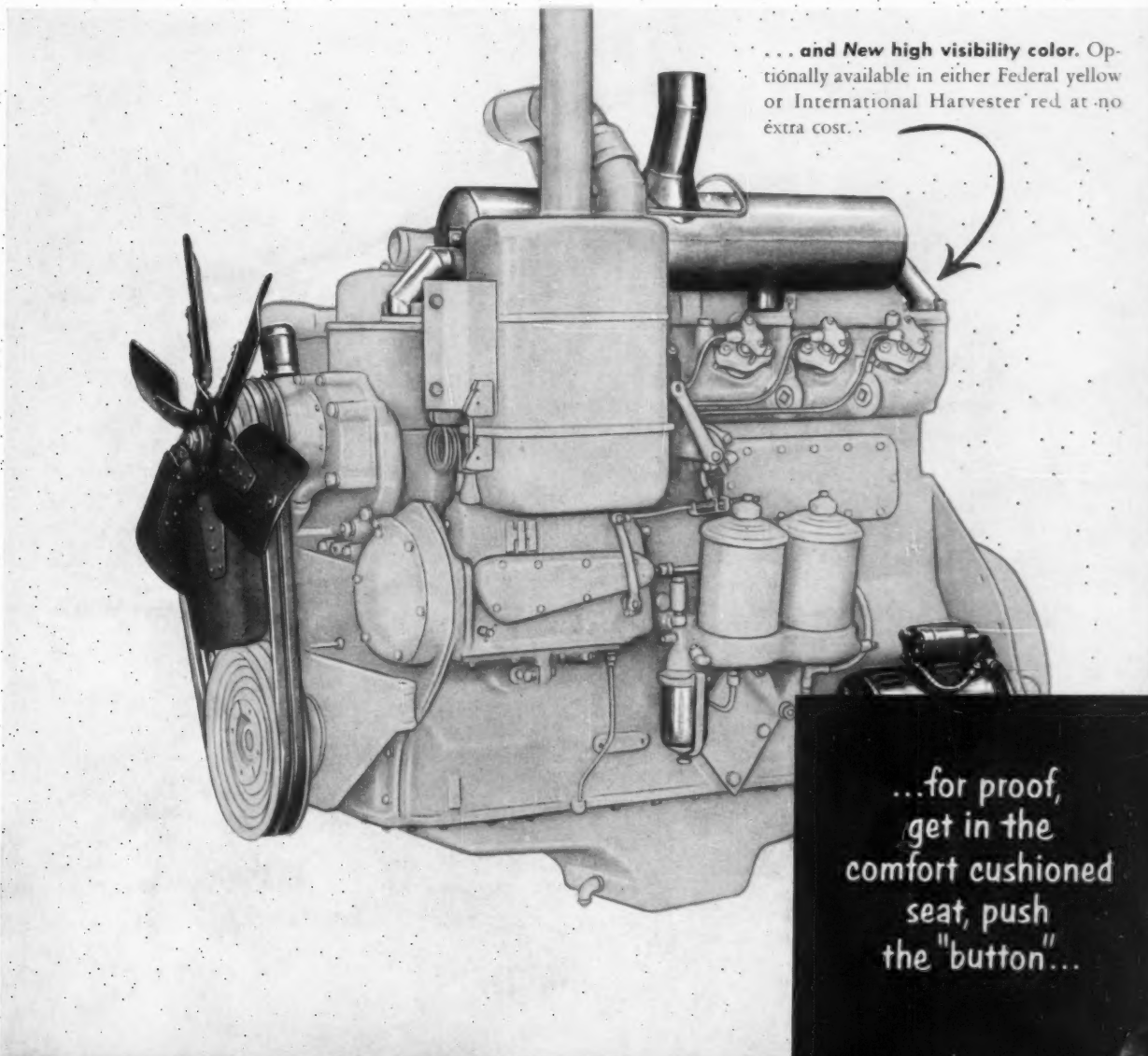
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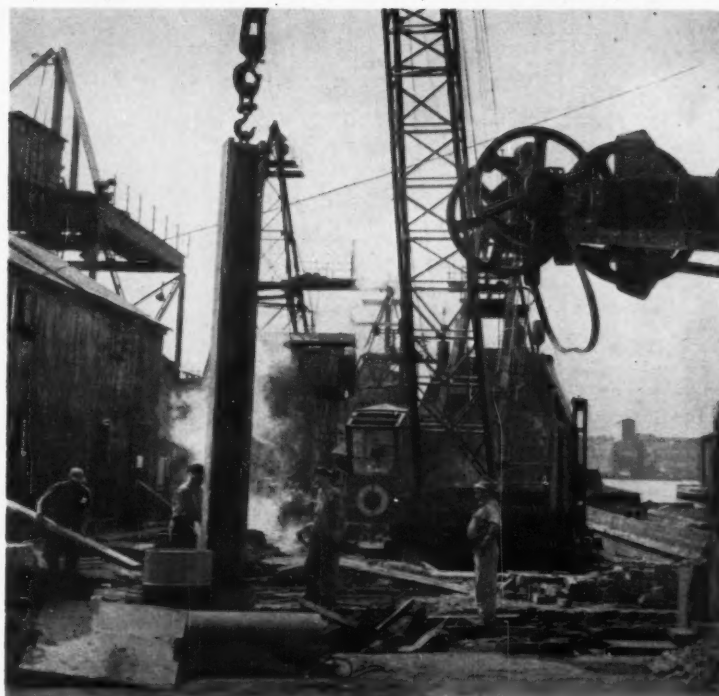
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Looking for a way to improve concreting of drilled-in caissons filled with water, a New York heavy foundation contractor comes up with a tremie-like operation that involves batching a homogenized grout and dispersing it through large-size aggregates in the caisson to make a stable concrete called Colcrete.

By ROBERT E. WHITE, Vice President,
Spencer, White & Prentiss, Inc.,
New York, N. Y.



PLACING CORE—American 45-ton Revolver derrick lowers 70-ft 14WF389 steel core into 30-in.-dia caisson shell. Core penetrates 13 ft through a pocket churned out of the bedrock.

Grouted-Stone Fills Caissons

WE'VE BEEN LOOKING for some time for a way to improve the process of installing drilled-in caissons on heavy foundation jobs.

We saw a good chance to try a new method involving colloidal grout when we landed a subcontract with J. Rich Steers of New York to install nine drilled-in-caissons for coal handling facilities at the New York City Transit Authority's 59th St. power plant.

The Transit Authority, to get coal to the plant from a nearby Hudson River Pier by belt conveyor, wanted a high conveyor bridge that would span 165 ft over the West Side Highway. This slender, high structure would have to withstand complex wind loads so it presented a foundation problem to the consulting engineers, J. G. White Engineering Corp. White felt the problem could be solved by drilled-in-caissons socketed into Manhattan's bedrock.

The bedrock, at this location on the filled-in-shore of the Hudson,

lies 55 ft below street level. What with soft Hudson River silt, boulders, piles, old rock-filled timber cribs, and perhaps even a sunken ship, it was bound to be a rugged job to get in a solid foundation. But the drilled-in-caisson type of foundation had proved itself as a support for an addition to the same power plant in 1948. That addition was built on 35 such units.

Caissons specified for this job consisted of ½-in.-thick, 30-in.-dia steel shells fitted at the bottom with 1½-in. tool-steel driving shoes to prevent the shells from being damaged during driving.

We drove the open shells down to rock with a No. 1 Vulcan single-acting hammer that delivered 15,000 ft-lb per blow. Sometimes we hit an extra large boulder which, during hard driving, threatened to damage even the heavy driving shoe. When this happened, we brought in a Bucyrus-Erie 28L churn drill to pulverize the obstruction.

When shells were seated firmly on bedrock, the churn drill, equipped with a 3,000-lb cross-shaped bit, chopped out a rock socket for each caisson 30 in. in dia and 13 ft deep into the rock.

We then lowered heavy 14WF-389 steel core beams into each caisson down to the bottom of the rock sockets. Reason these beams were so heavy was on account of the vertical loads and the bending moments caused by wind stresses.

The next and final step in constructing the caissons was to fill the shells around the core beams with concrete. This part of the process is what we sought to improve.

Biggest problems came from water and confined work space. We had to fill the caissons with water to balance the outside hydrostatic head. Balancing the head was necessary—as construction men have learned in the past—to prevent a small seam or fissure in the rock from sending ground water flowing up under the pressure and washing the ce-



WHIPPING GROUT—Colgrout mixer homogenizes mixture of cement, sand, and water to make colloidal grout. Mixer transfers grout to a pump that feeds it into caisson.

ment and sand in the concrete up to the surface.

Having water inside the caisson normally makes a tremie concreting operation necessary. You pour a grout seal with tremie bucket to a level a few feet above the cutting edge then place the H-beam into the tremie seal before the grout sets. When the seal sets, you pump or bail water out to the top of the seal and place the balance of the concrete.

But specifications problems as well as restricted work space cause trouble. For instance, on a large drilled-in-caisson job we did recently, tremie concrete was specified to have a minimum 28-day strength of 5,000 psi. But the slump allowed was only 2 in. It seemed that consulting engineers on the job worried about whether shrinkage problems would increase if the slump were too high.

Colcrete Method

A unique way to improve on the concreting method came to our rescue. It's called the Colcrete method. It involves filling a caisson shell with 1½-in. minimum size aggregate; then, in a single operation, injecting up through the aggregates a rich grout that converts the mass in the caisson to a sturdy concrete. Shrinkage proves nil—you merely grout up voids between aggregate stone already in point contact.

Before putting the method to work on the power house job we ran a full scale test of the method in our yard in Astoria, N. Y. The method proved better than satisfactory. But neat as it is, it de-

mands the use of a critically stable grout that we could obtain only from the double-drum Colcrete mixer, a grout mixer made by Colcrete Structures of New York City.

This patented, double-drum mixer mechanically produces, without chemical admixtures, a stable cement-sand colloidal grout. Regular concrete sand is used. When this grout is injected through large aggregates, the result is Colcrete.

The mixer consists essentially of two units driven by a 34-hp Wisconsin gasoline engine. Each unit has a cylindrical, hopper-bottomed tank supported by a trap that mounts a hard iron casting to which mixing rotors are fitted. Shafts carrying the rotors are mounted on self-aligning ball bearings driven through Vee-ropes that run from the pulley of the power unit.

The shaft of the first unit carries a self-centering, fully floating "cement disk" that revolves at about 1,500 rpm with a ½-in. clearance on either side in the body casting. The unit is fitted at the top with a cone on which up to three 94-lb bags of cement per batch are dumped. The cone splits the bag, sending cement into the previously discharged and circulating water. A colloidal cement-water grout is completely mixed in this unit in about 15 sec.

A workman then pushes a lever and the cement-water grout passes at high speed and at a pressure of 20 psi through a pipe into the second unit where sand is added.

This second unit, essentially, is



SETTING PIPE—Workmen place feed pipe that carries Colgrout to bottom of shell.



TESTING GROUT—Engineer pours sample into flowmeter to check grout's consistency.

the same as the first except that it carries a sand distributing cone and a fully floating sand impeller. Sand is added and mixed by circulation to form a stable cement-sand-water grout. Result is a thoroughly mixed grout with particles evenly distributed somewhat like homogenized milk.

The unit's impeller doubles as a pump that sends the completed grout at 20-psi pressure through 2¼-in. hose. The impeller works with a sweeping, or trailing action.

Normally, when charged by an

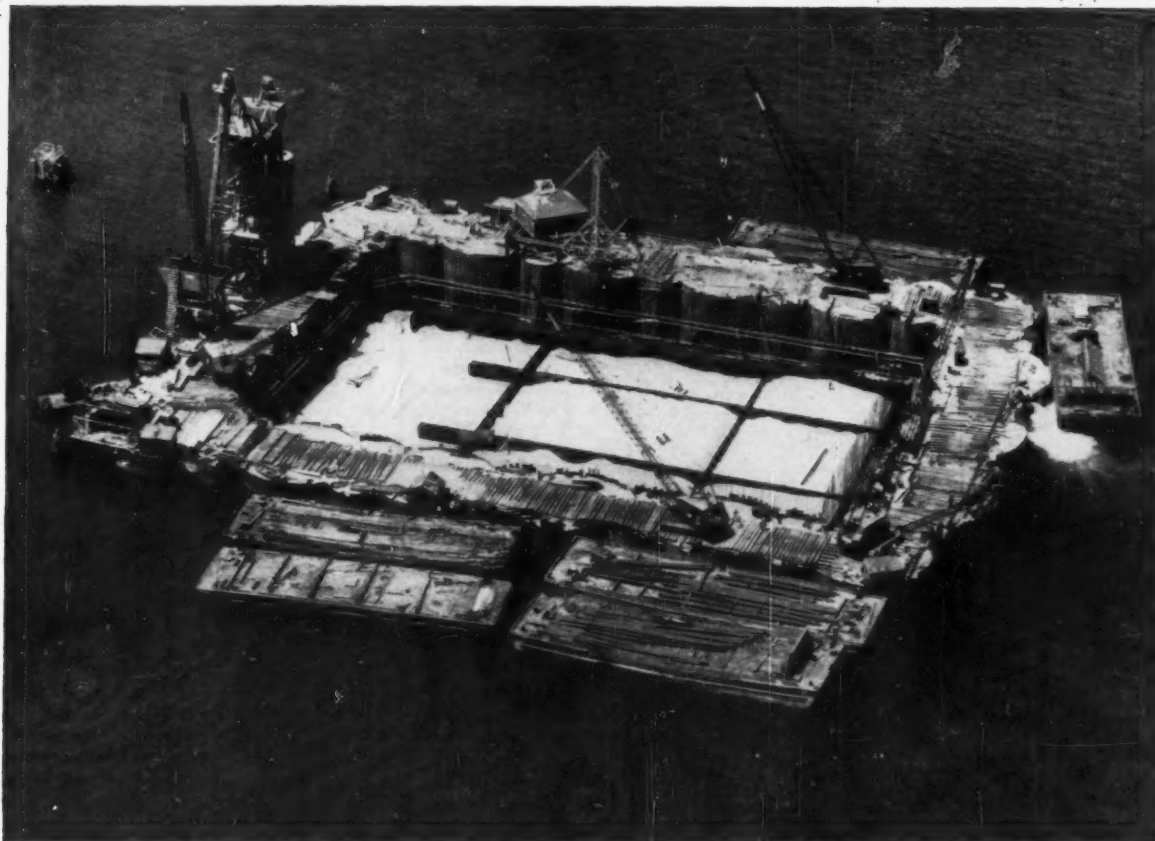
HOW TO HANDLE WET JOBS

#44 of a Series

Project: Queens Anchorage; Throgs Neck Bridge, New York City

Contractor: Steers-Snare, a joint venture

Engineers: Ammann & Whitney



Sinking of huge bridge caisson speeded after wellpoints...

Dewater Man-Made Island 30 ft Below River

In order to sink this giant caisson a cofferdam-enclosed sand island was required. (See photo). Confident that wellpointing would result in a time and money-saving operation, Steers-Snare built the island not up to river level (which was the preliminary plan) but 25 ft below,

- This greatly reduced the yardage of sand fill, thereby eliminating additional excavation later on. However, Griffin

engineers were confronted with a difficult dewatering job, since investigations indicated many unusual problems of soil mechanics, hydraulics and stability.

- **Solution?** A specially designed Griffin wellpoint system which attained absolute control of ground water and uplift pressure and insured the stability of the cofferdam.

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ROUTED-STONE FILLS CAISSONS . . . continued

overhead batching plant, the mixer turns out 40 mixes or about 320 cu ft of 1:3 grout hourly. The concrete equivalent depends on the voidage of the aggregates, but the average is between 20 to 27 cu yd hourly.

On the test in our Astoria yard, we poured underwater an experimental 24-in. caisson 33 ft long complete with a core beam. When it was completed, we pulled it out of the ground, tore it apart, then had Robert W. Hunt Co., testing

engineers, run compressive tests on 7-in. cubes sawed from the middle of the caisson.

Hunt reported back that the average 28-day compressive strengths of six samples was 5,952 psi. We knew the test was a success. Laitance at the top of the pour was only about 1 in.—very little for a 33-ft-deep underwater pour.

We obtained approval to use the process from J. G. White and the Transit Authority, then be-

gan Colcreting the nine caissons. Because the quantity was small—only about 45 yd of grout in all—we didn't bother with an elaborate set up but hand-charged the mixer. A batch plant and other labor-saving improvements could speed up other jobs.

How System Works

This is how the system works on an actual job. First, after a caisson shell has been driven and socketed in the rock, a derrick slips the heavy steel core into position. Two 2-in. flush-jointed steel pipes are placed in the caisson from bottom to top; the first pipe discharges the Colgrout at the bottom of the caisson; the second pipe is identical but its walls are slotted to admit grout from the outside. (This is a sounding pipe. When a weight of the correct specific gravity is lowered into it from above during the grouting operation, workers can tell to what level the grout has reached.)

Next, we dump the coarse aggregates and bring them to the cut-off level of the caisson shells. We start the mixing machine working to feed a pump for forcing grout down the injection pipe. The pump is a Moyno-type (helical screw, positive displacement) called a Colmono No. 10. Powered by a 25-hp Wisconsin engine it delivers 30 gal of grout per min without pulsations at pressures up to 100 psi.

The process works somewhat like a tremie operation in that the grout builds up a mass without dispersing at the bottom of the shell and at the same time flows around the individual aggregates filling the voids.

During the pour, the pipe is lifted by a come-along anchored to the top of the steel core. Workmen keep constant check on the level of the grout through the sounding pipe. In this operation the grout level was kept 25 ft or so above the bottom of the injection pipe. Pump pressure builds up to about 50 psi.

The technique has, as far as we're concerned, proved more than successful and we'll continue to use it.

Vincent Fahey was our superintendent for the work. For J. G. White Engineering Corp., Alan Michael was structural engineer; Robert McLaughlin was resident engineer.

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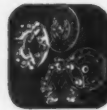
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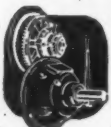
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Instantaneous GRAVITY DUMP

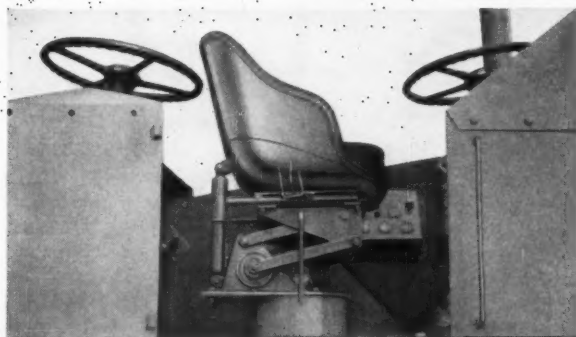
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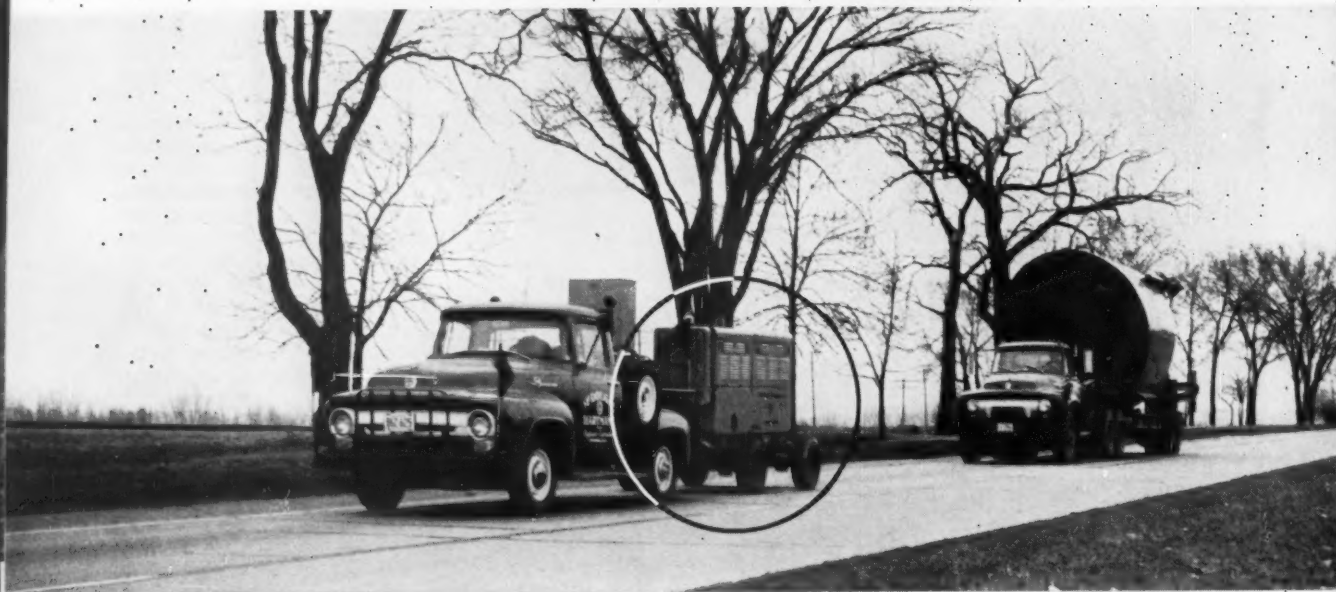
Milwaukee 16,



Wisconsin

K849

Cat power saved these owners \$1,300

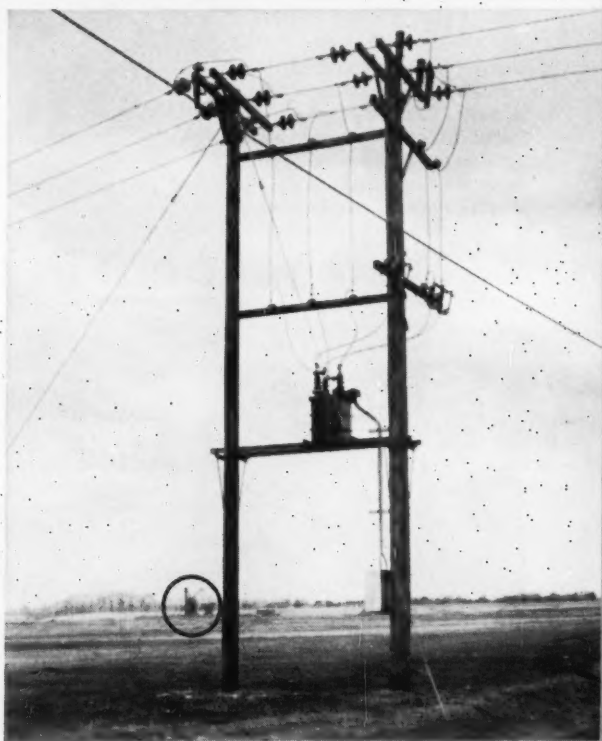


1 McDougal-Hartmann Co.'s, Heltzel Bin Hardy and Johnson Automatic Batching Plant follows their 40 KW Cat D315 Portable Electric Set to its fourth job site. Savings during the first year of ownership while moving them, alone have amounted to \$3,900. Operational savings are not even included. The owners estimate that running in and hooking up to public utility power would have averaged at least \$1,300 per move. An additional \$1,200 was saved at the outset since the Electric Set would operate the plant's higher voltage electric motors which were supplied as original equipment.



2 At a previous job location in Sterling, Illinois, this unit produced 86.4 batches per hour for use on one of the firm's nearby road construction jobs.

Without portable power, it often requires the more common technique of setting up the batch plant along a railroad siding or right-of-way, bringing in materials by rail if the haul distance to the job is not excessive. Concrete specifications in some states limit the haul distance of mixed concrete due to the time element. All in all, Cat portable power saves operating time, cuts costs.



3 Many contracting companies with multi-state operations, such as McDougal-Hartmann, require power portability to avoid the frequent high cost and inconvenience of obtaining power in remote areas.

On their present job it would have necessitated stringing poles and wire from this power line to the plant location (in the circle). Instead, the highly mobile Cat Electric Set was rolled up alongside the batching plant, and hooked up with wall plug simplicity ready to go.

each time their batching plant moved



4 Performance and savings with this plant brought Mr. Jack Hartmann, Vice President (right), and Bud Moore, his C.D.E.S. (Caterpillar Dealer Engine Specialist), out to the job to plan a second batching plant installation. Satisfaction resulted in an order for a second identical Cat Electric Set for this contractor's expanding operations.

Mr. Hartmann remarked, "ABOUT ONE MORE MOVE AND OUR FIRST PORTABLE ELECTRIC SET WILL HAVE PAID FOR ITSELF IN SAVINGS FROM MOVES ALONE AND IN LESS THAN TWO YEARS. THAT WE LIKE TO SEE."

Engine Division, Caterpillar Tractor Co., Peoria, Ill., U.S.A.
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5 The all-new, self-regulated generator for Cat Electric Sets is simple to operate. Voltage is adjustable from 5% above to 10% below nominal rating and regulated within 3 1/2% of rated voltage. It has unsurpassed motor starting ability. Other performance features Mr. Hartmann liked were:

1. Low over-all cost per operating hour.
2. No down time due to power failure or engine failure.
3. No additional help required, due to the unit's simplicity and self-regulating standard equipment.
4. Advertised power produced and maintained.
5. His Caterpillar Dealer Engine Specialist, Parts and Service teams were on around-the-clock availability if anything went wrong. It didn't.

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LOADING—As the front bucket of R. G. LeTourneau's new earthmover scrapes up 65-ton payload, the empty rear bucket—with an electric motor in each of its four wheels—acts as an auxiliary pusher.



SPREADING—Front bucket spreads to a given depth, and rear bucket deposits its load atop the first layer. Bowls are powered by electric motors; they can be unloaded together or one at a time.



Scraper Carries 100 Yards

A SCRAPER with two bowls, each capable of digging, hauling, and spreading 65 tons (about 50 yd) of earth. That's the new machine R. G. LeTourneau, Inc., is offering earthmoving contractors.

This monster is nearly four times as big as any scraper in use today. It's nearly twice as big as the 70-ton capacity scraper LeTourneau unveiled two months ago.

Big as it is, it takes only one man to operate it. A single operator controls the machine through every stage of operations from a push-button control panel.

Specifications give an idea of its size and potential. The rig is more than 100 ft long; it weighs 130 tons empty and carries a 130-ton payload; it has 1,200 hp under the hood; its tires are 48 ply; its cutting edge is 12½ ft wide; and its purchase price is "in excess of \$200,000."

The big scraper is designed around the "electric-wheel" drive system R. G. LeTourneau developed for special purpose off-the-road machines during the last five

years. Every wheel is a driving wheel, powered by an individual electric motor.

Two 600-hp Cummins turbo-charged diesels under the hood drive both ac and dc generators. The dc generator furnishes power to motors that are geared directly to the rims of the eight wheels; the ac generator powers motors that control operations of the two bowls.

Because of the eight powered wheels, and the double-bucket arrangement, pusher requirements are "nil," says LeTourneau. The bowls load one at a time. As the front bucket scrapes up its 65-ton load, the empty rear bucket—with a motor in each of its four wheels—serves as a pusher.

As the rear bucket loads, the increased traction provided by the load in the front bucket makes the front four wheels an efficient "puller." In most materials the loading operation can be completed without tractor pushers.

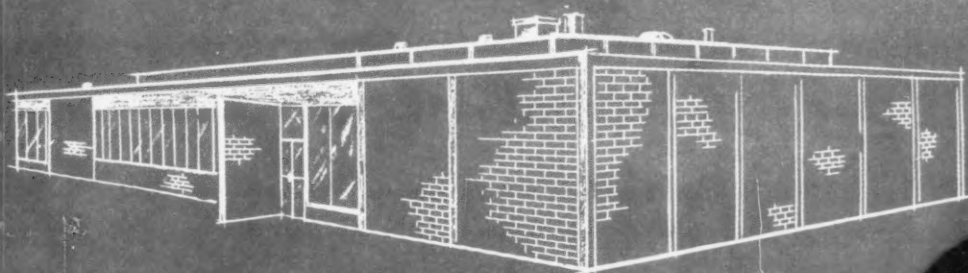
On the haul, the electric motors inside the eight wheels are geared to propel the scraper and its 130-

ton payload at about 16 mph. The scraper can travel just as fast backward as forward.

LeTourneau-designed oversized wide-base and tubeless tires (89-in. over-all diameter, 40-in.-wide base) are said to provide excellent flotation characteristics, considering the big payload. The machine's turning radius is 51½ ft, highest of any scraper.

There are several ways the rig can spread its load. The front bucket can spread to a given depth, and the rear bucket can deposit its load atop the first layer. Or the two buckets can unload consecutively to form a continuous layer. Or the front and rear buckets can spread at two different locations if the job calls for that kind of an operation.

The scraper is, of course, a highly specialized earthmover. LeTourneau sees it as a machine that "will revolutionize dam-building and canal-digging techniques. Jobs previously considered too expensive now will become routine," say LeTourneau engineers.



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Big Rigs Boost Production

A drill jumbo that mounts 12 drifters on four levels and the biggest muck trains ever used in this country pay off in low cost, high volume production on a pair of large bore tunnels.



MUCK TRAIN—A 25-ton locomotive pulls three-car train that hauls blasted rock from tunnel headings. Winch mounted on platform on first car operates slusher inside train.

MUCK TRAINS made up of three huge interconnected rail cars haul 150 cu yd of muck per trip from two tunnels being driven as part of California's vast Feather River Project.

The large size of the bore (excavated tunnel section is 21x30 ft) gives contractor Peter Kiewit Sons' Co. a chance to experiment with over-size equipment, and so far their careful planning has paid off with low costs, high production. Kiewit averages 250 ft of driven tunnel in a five-day week with three shifts a day.

The two tunnels will carry the relocated single track of the Western Pacific Railroad around the site of Oroville Reservoir, key feature of the multi-purpose water development program.

One tunnel is 8,830 ft long; the other, 4,420 ft. A narrow canyon separates the two portals, which are 260 ft apart. Constricted space in the area between the tunnels made fitting in shops, stockpiles, compressor shack, and switching track a tight squeeze. But the proximity of the tunnels is otherwise a boon—drilling and mucking equipment are worked in each heading by turn. While a drilling crew works in one heading, another crew mucks out in the other tunnel.

The drilling jumbo, like just about everything else on this job, is big. The 44-ft-long standard rail car that mounts the drills carries 12 drifters, three on each of four levels. A 5½-in. drifter bores the 6-in. burn-cut hole, the

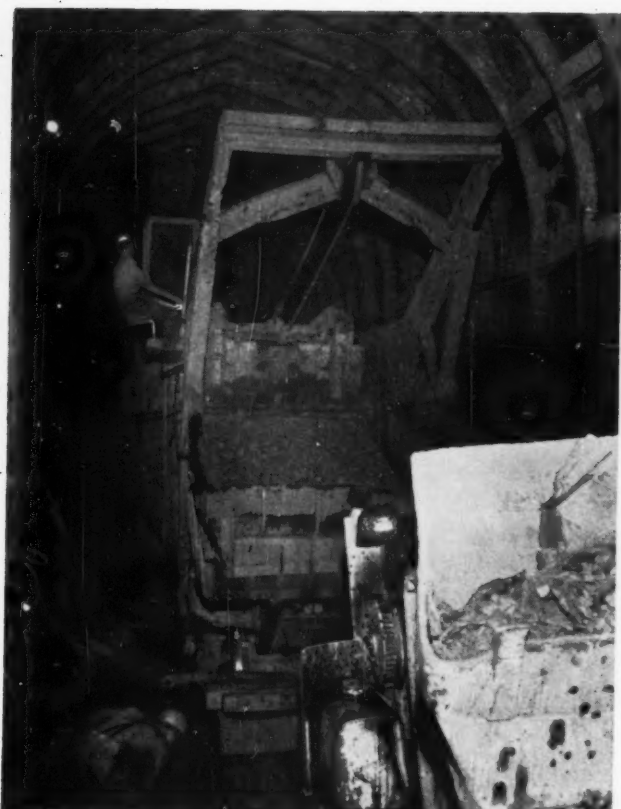
other drifters are 3½-in. dia. The drills bore 12-ft-long holes without a change of steel. All drills and their hydraulic jibs are Gardner-Denver equipment.

Kiewit Designed Rigs

The equipment was especially designed by Kiewit with the primary aim of holding costs down. Speed is not critical; the tunnel will be completed long before other relocation work is finished. But with a bid of only \$12 per cu yd on tunnel excavation, Kiewit doesn't have much margin between the red and the black.

Such huge interconnected rail cars previously had been used only in mining. Anaconda Copper developed the method for hauling ore at its Chilean mines. Kiewit

on Tunnel Job



LOADING—An Eimco 105 loader dumps muck into hopper of train at tunnel face. Each round develops 400 cu yd, or 2½ train-loads.

sent a team of engineers to Chile to see the equipment in action and returned convinced that they could adapt the method successfully to the Feather River tunnel job.

There are two muck trains on the job. Each train consists of three interconnected cars mounted on standard railroad running gear. Each car is 50 ft long. Width is limited to 8½ ft so two trains can pass inside the tunnel. High, built-up sides boost capacity of each car to about 50 cu yd. Yuba Manufacturing Co. built the two trains from plans drawn by Kiewit engineers.

At the face, an Eimco 105 tractor-mounted loader dumps shattered rock into a hopper at the end of the train. A slusher or

scraper blade, mounted on rails at mid-height in the car moves the rock along the length of the train. A 100-hp electric motor powers the cable operated blade. The motor gets its current from a direct-coupled generator on the 25-ton, 160-hp Plymouth locomotive that hauls the cars.

How Slusher Works

The Vulcan slusher scrapes muck back into the cars at a rate of 5 cu yd per pass. It fills in the space below the rails inside the cars first, beginning at the mucker end. Then the slusher works back from the opposite end to fill the part above the rails. The operator of the slusher sits on a platform that projects out from the side of the car at the hopper



SLUSHER—Pair of rails mounted inside the cars at mid-height carry slusher blade that distributes muck along length of train.



DUMPING—Hydraulically operated gates at bottom of cars discharge muck alongside tracks. Dozer then spreads muck over dump.

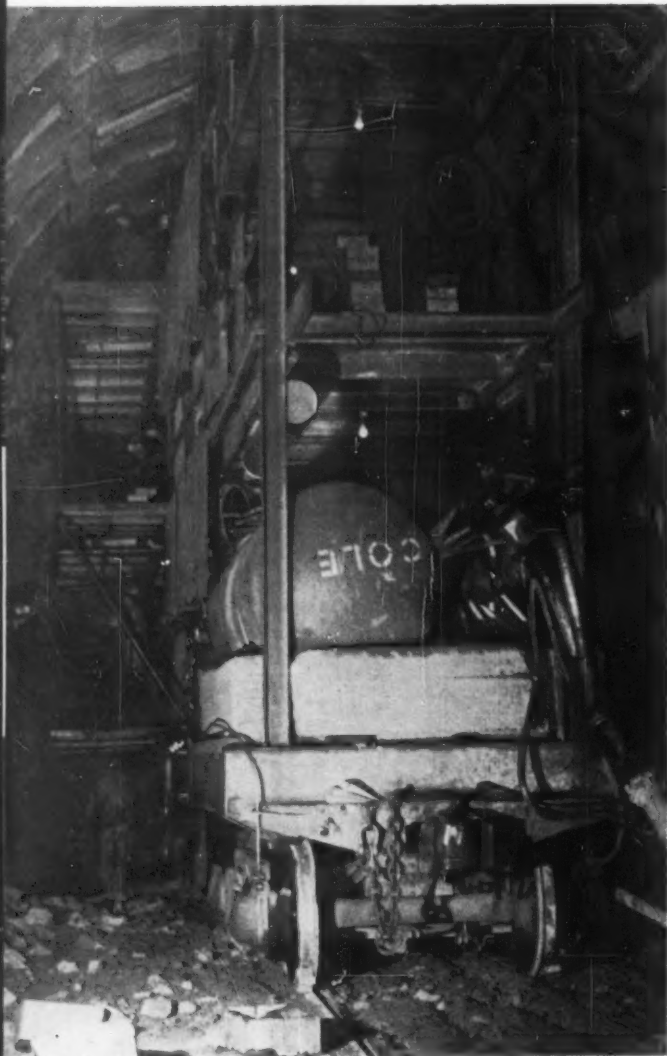
end and is protected by a cage.

Hydraulically operated gates along the bottom of the cars discharge the muck to one side of the tracks at the dumping area. A Caterpillar D8 dozer spreads the rock over the dumping area between the tunnel portals. Kiewit uses a dozer to spread the muck because dumping directly down the sides of the muck pile would require frequent changes in track layout.

About 400 cu yd of muck are developed in each blasting round. This amounts to 2½ trainloads. With two trains on the job, mucking is interrupted only twice each cycle for the brief time that it takes to pass an empty train into the heading on a siding.

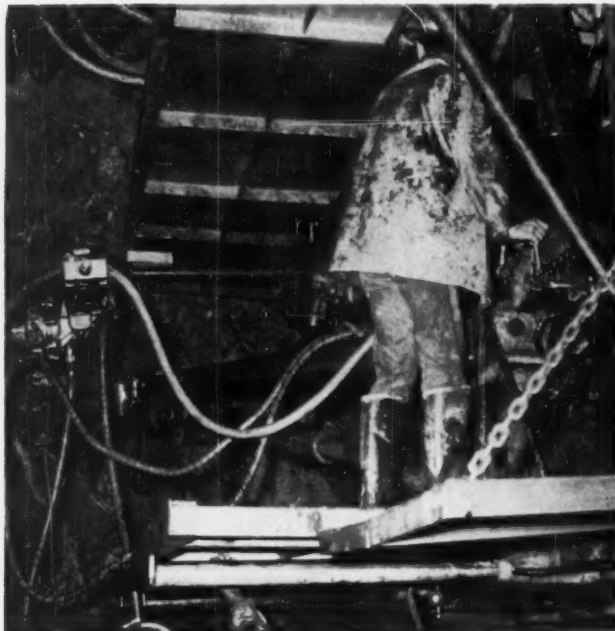
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Drills Bore 12-Ft Holes in One Setting



JUMBO—Drill carriage is standard rail car that mounts 12 drifters on platforms extending from front. Air receiver and concrete block at rear serve as counterweights.

DRILLING—All drill controls are 20 ft back from face of tunnel to protect workmen from rock falls. Hydraulic jibs that move drills permit 5-ft horizontal displacement.



All drill equipment on the jumbo is mounted on hydraulic jibs. The drills have 5 ft of horizontal movement besides the normal vertical and diagonal reach. This permits positioning of the drills close to the tunnel face—an important consideration in drilling a full 12 ft. depth with one setting of drill steel. The shorter the total length of steel, the less vibration and loss of drilling energy.

All drill controls are located about 20 ft back from the face

to protect workman from possible rockfalls. An air receiver and a block of concrete at the opposite end of the drill jumbo serve as counterweights to balance the drills projecting from the front of the jumbo.

Each round involves about 120 holes, centered around a 6-in. burn cut. The other holes are 1 $\frac{3}{4}$ to 1 $\frac{5}{8}$ in. Time required to complete a drill cycle varies considerably, but crews average about 1 $\frac{1}{2}$ per shift. Sometimes mucking is slow and holds up drilling, but

seldom for more than an hour. Ordinarily, the two operations balance out fairly well.

The type of rock varies; it's mostly dense shale metamorphosed almost to slate. Drilling speed averages a little better than 1 $\frac{1}{2}$ ft per min. The powder charge is a mix of 40% to 60% semigel dynamite, detonated by a combination of milisecond and standard delays. Powder use averages 3 lb per cu yd of muck.

Pressure for all hydraulic equipment on the drill jumbo is



DRIFTER—Big 5½-in. drifter drills 6-in. burn-cut hole in center of 120-hole pattern. Jumbo operation requires 4,000 cfm of compressed air. Drills average 1½ ft per min.

RIG HANDLES RIBS—Three 2,000-lb air tuggers power hoisting rig that the contractor mounted on rail car for handling steel ribs and ventilation pipe inside the tunnel.



developed by air pumps. The jumbo operation requires about 4,000 cfm of compressed air. The compressor house, located in the shop area between the tunnel portals, has a 5,000-cfm capacity. Six compressors—two Joy-Sullivan, two Chicago-Pneumatic, and two Ingersoll-Rand—make up the bank.

Job-Built Hoisting Rig

Steel ribs spaced on 6-ft centers support the roofs of the tunnels. Ribs are 8-in. WF sections

curved at the top to the radius of the arch roof. The contractor developed a special rig for handling the ribs. Mounted on one end of the rail car that carries them into the tunnel is a stiffleg derrick powered by three 2,000-lb air tuggers—one for hoist, one for boom, and one for swing.

The car also carries sections of the 36-in. ventilation pipe. Joy Axivane fans push 35,000 cfm through the lightweight conduit to feed fresh air to the headings.

The tunnel contract is among

the first awarded for the giant \$1.6-billion Feather River Project—biggest construction job ever undertaken by a single state. A newly created agency, the California State Water Resources Department, will supervise all work on the project. Top man is Harvey O. Banks, director. Walter G. Schultz is chief engineer.

Project manager for Kiewit on their \$8.5-million contract is John W. Alltucker. His field superintendent is Paul Eller. Frank McLean is project engineer.

"Euc" scrapers match any

3 TYPES

Euclid offers you the most complete line of self-powered scrapers in the industry—and they're all job-proved to give you more work-ability and low cost yardage. No matter what your job may be—from small clean-up or grading work to big yardage projects—there's a size and type that meets your requirements.

SIX-WHEEL SCRAPERS

These models provide maximum stability for long, high speed hauls. They have capacities of 12, 18, and 24 yds. struck... are powered by engines of 218 to 335 h.p. and haul heaped loads of 16, 25 and 32 yds. at speeds up to 30 mph. These scraper bowls are interchangeable with bottom-dumps of 13, 17 and 25 yd. capacities.



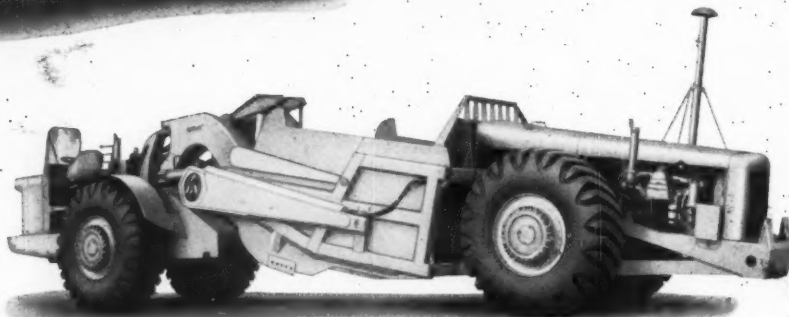
OVER-HUNG ENGINE MODELS

Payload capacities of these "Eucs" are 7, 12 and 21 yds. struck... 9, 17 and 30 yds. heaped. Over-hung engine design of tractors provides excellent maneuverability and ease of handling in difficult work... engines are 143, 218 and 325 h.p. Rear-Dump trailers of 12, 22 and 35 ton capacities are interchangeable with the scrapers.



TWIN-POWER SCRAPER

With a total of 518 h.p., this Euclid has a struck capacity of 24 yds... 32 yds. heaped. Two engines, each having a separate Torqmatic Drive, enable this "Euc" to work independent of other equipment and move more yards at lowest cost on any scraper job.



Your Euclid dealer can supply performance and cost data on the Euclid Scrapers best suited to your operations. Have him show you why Euclids give you the best return on investment.



EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

size or kind of job

7 MODELS job proved for high production



S-7

Model S-7 is equipped with 143 h.p. engine... 18.00 x 25 tires... 4-speed Torqmatic Drive... full hydraulic 90° steering. Capacity is 7 cu. yds. struck and 9 yds. heaped at 1:1 slope. Optional tires are 21.00 x 25.



S-12

Powered by a 218 h.p. engine, the Euclid S-12 Scraper has a 5-speed transmission... 24.00 x 25 tires... full hydraulic 90° steering. Struck capacity is 12 cu. yds. at 1:1 heap, 17 yds.



S-18

This Model S-18 has a 325 h.p. engine with 4-speed Torqmatic Drive and converter lock-up. Struck capacity is 21 cu. yds. at 1:1 heap. Tires are 27.00 x 33 with 33.5 x 33 optional... full hydraulic 90° steering.

EUCLOUD
Division of General Motors Corporation
Cleveland 17, Ohio

TS-24

The Model TS-24 has a 300 h.p. engine for the tractor and a 218 h.p. engine for the scraper... each with a separate Torqmatic Drive. Heaped capacity at 1:1 is 32 cu. yds. at 24 yds. struck. Full 90° hydraulic steering... 27.00 x 33 tires with 33.5 x 33 optional.



SS-12

This 4-wheel tractor model has a struck capacity of 12 cu. yds. at 17 yds. heaped... with 218 h.p. engine and 5-speed transmission. Tire sizes are 12.00 x 25 front and 21.00 x 25 on drive and scraper wheels with 24.00 x 25 optional.



SS-18

The Model SS-18 has a 300 or 320 h.p. engine and 3-speed Torqmatic Drive or a standard 10-speed transmission. Capacity is 18 cu. yds. struck and 25 yds. heaped. Drive and scraper tires are 24.00 x 25 with 29.5 x 25 optional... hydraulic booster steering.



SS-24

A 325 or 335 h.p. engine with Allison 4-speed transmission and converter lock-up powers the Model SS-24. Struck capacity is 24 cu. yds. at 32 yds. heaped. Drive and scraper tires are 27.00 x 33 with 33.5 x 33 optional for maximum traction and flotation.

"Euc" Scrapers have hydraulic lever action, 4 section adjustable and reversible cutting edges, unequalled accessibility for servicing and other cost-cutting advantages. Check job performance and return on investment before you decide on any scraper equipment.

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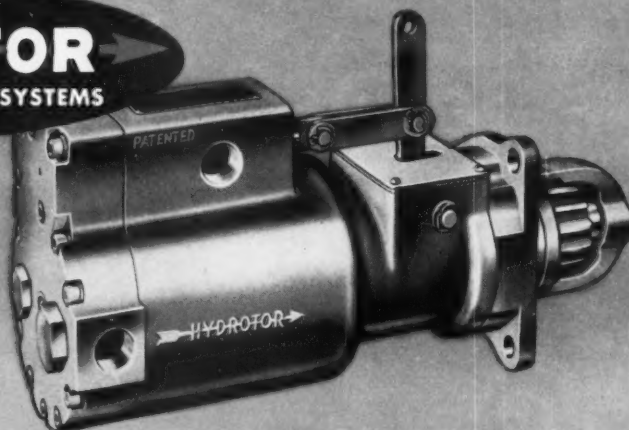
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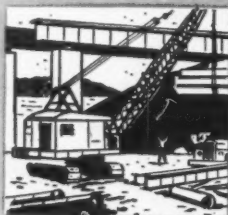
revolutionary system that uses oil under high pressure to crank diesel or gasoline engines *faster with greater power*. You'll want the outstanding performance and dependability—the economy of HYDROTOR for your engines. Send today for free brochure H110-02-2 and the name of your nearest Hydrotor distributor. American Bosch Division, American Bosch Arma Corporation, Springfield, Mass.

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proved best by far for performance, for dependability, for low over-all cost.



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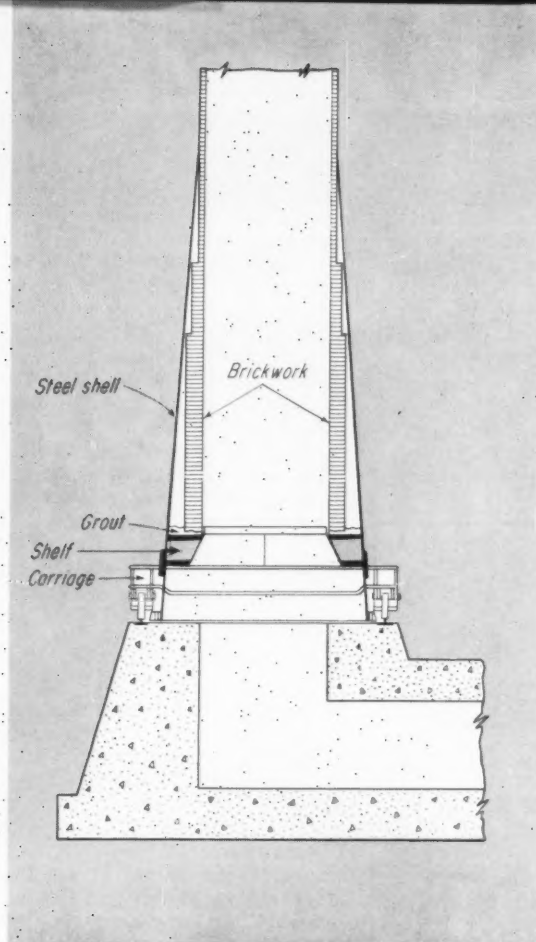


FOR MARINE USE



FOR OIL FIELDS

AMERICAN BOSCH ARMA CORPORATION



PREPARATION—Steel shelves welded in segments to inside of casing will support brick lining. Carriage moves stack to new position.

FOR YEARS the tall, slender stack stood outside the Newcastle Steel Works in New South Wales, Australia, perched like a rocket ready for a shot to the moon.

Then someone discovered that the stack's foundation was rotting. Closer study by plant engineers revealed that the foundation was in bad shape and that there was no way to underpin the structure. The stack had to be moved to another foundation.

That raised the question of how to move a 231-ft-high, brick-lined steel shaft nearly 11 ft in dia. without damaging it.

The plant's construction engineer, H. E. Hughes, devised a method for doing the job. It involved cutting the stack free from the old foundation, jacking it up, then rolling it over rails to a new foundation.

A new foundation for the stack was built 50 ft away. While this was being constructed, workmen prepared the stack for moving day. This took some doing.

The stack had a brick lining 15 in. thick at the bottom and 4½ in.

thick at the top. Angle-iron retaining rings on 15-ft centers stabilized the brickwork in the top 195 ft of the stack. But in the cone-shaped base, brick was self supporting for a height of 36 ft. Self-supporting brickwork did not come out with the stack base, so this left a space of 21 in. between brick and casing at the bottom.

Lining either had to be removed and then rebuilt after the stack had been moved, or else stabilized in some way so that it would hold its position during the move. It figured to be cheaper to move the stack with brickwork intact.

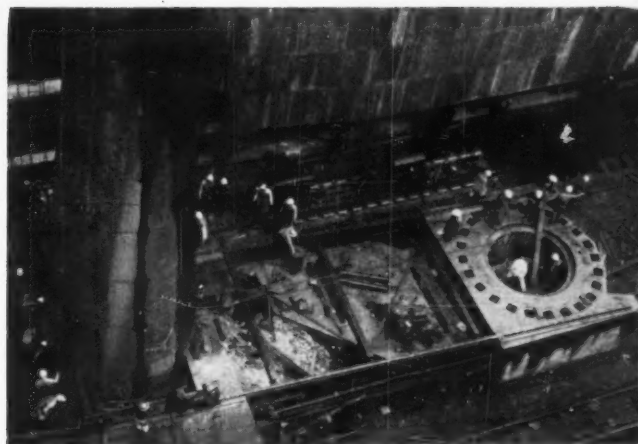
Hughes' answer was to build a reinforced steel shelf and weld it to the inside of the casing near the base to support the brickwork.

Hughes' built this circumferential shelf in eight segments. The shelf consisted of a top flange made from 1-in. steel plate 33 in. wide and a lower flange of the same plate thickness 18 in. wide. These were spaced 26 in. apart

and reinforced by twelve ½-in. steel-plate webs. Purpose of building the shelf in segments was to work it under the brickwork piece by piece without weakening too great a portion of the lining.

To install each segment, a hole first was cut through a section of the shell at the base. A workman crawled through the hole and removed a portion of brickwork, then welded a section of shelf against the casing.

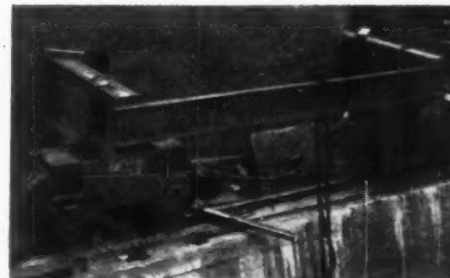
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MOVING—Winch pulls the stack over rails at rate of 1½ ft. per min. to its new foundation. The entire move takes only 30 min.

Stack Goes For a Ride

A clever idea makes it possible to move a 231-ft smoke stack to a new foundation 50 ft away without first removing and later rebuilding the stack's self-supporting brick lining.



CARRIAGE—Stack rides on four sets of two-wheel bogies bolted to a steel frame.

STACK GOES FOR A RIDE... continued

Grout was forced in to pack the space between shelf and brick. A 1x6-in. flat, welded on edge to the inner circumference of the shelf, retained grout and allowed sufficient head to develop so that grout flowed up in the space between brickwork and steel casing insuring a secure hold for the brickwork.

Remaining shelf segments were passed in to the workman in the stack who repeated the brick removal, shelf welding, and grout-

ing until the entire shelf was in place supporting the stack lining. Brickwork then was checked for cracks. None had occurred so all brickwork below the supporting shelf was removed.

Workmen reinforced the outside of the stack at the base by welding to it a 2-ft-wide, ½-in. steel band. Top edge of the band bore up against a lap joint in the casing. Two holes cut through the stack on 11-ft centers just below the reinforcing band accom-

modated the steel lifting beams.

The two lifting beams were of welded construction; each had a maximum section of 8x26 in. with 1¼-in. flanges and a single ¾-in. web.

To handle moving, a two-wheel bogie was fitted under each end of the two lifting beams to make two carriages with four 2-ft-dia steel wheels fitted onto an alloy steel frame.

Carriages were set over 4x4-in. rails welded to two 7x24-in. beams on 19-ft centers between the old and new foundations.

The engineer set guy wires at the stack top to keep it perfectly plumb during movement. Guys anchored to piles about 200 ft. from the stack. So that the guy wires could be adjusted during stack movement, they passed through a pair of treble blocks attached to the base of the stack and out to 6-ton winches.

Winches operating these restraining guys would have to maintain an even strain during the entire moving operation. Any excessive pull might throw the stack out of plumb and put an overload on traveling bogies. Hughes suspended a plumb bob on the stack 35 ft above its base to keep close check on plumb during movement. The plumb bob's wire passed down and over a marked plate set at base level. Immersing the plumb bob in a tank of water steadied it.

Moving the Stack

When moving time came, four 100-ton hydraulic jacks under the lifting beams raised the stack 1½ in. from its foundation. Then bogies were bolted to the jacking beams, and the stack again was lowered.

Twenty-four 3-in.-dia hold-down bolts that anchored the stack to the old foundation were burned off just prior to the moving of the stack. A winch then pulled up on a set of cables secured to the stack base, and the tall pipe slowly moved over the tracks onto the new foundation. Excluding preparatory work, the entire moving job took 30 min.

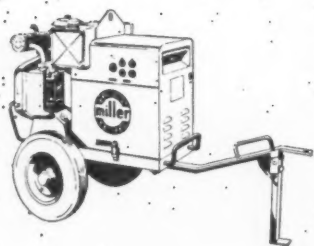
When the stack reached its final resting place, jacks again were fitted under the lifting beams, and the stack was lowered onto its new foundation. Extension bolts passed through the base ring and screwed downward into sleeve nuts set into the new foundation.

THE ENGINE- DRIVEN WELDER/ POWER PLANT with the



100% DUTY CYCLE

An original Miller design with performance standards, ruggedness and versatility that have made it a top hand from the Texas oil fields to New York dairy farms. Because, whether the AEA-200-L is hub deep in mud welding a derrick brace, or supplying power for lights and milking machines, or answering an emergency call aboard a repair ship... IT DELIVERS. Currently a best seller in the highway construction market, the Miller AEA-200-L is handily the "finest in the field," and here's why:



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- Uses any ac or ac-dc 1/16" to 3/16" electrodes
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Other Miller welder/power plants for metallic arc and TIG welding to 350 amperes.

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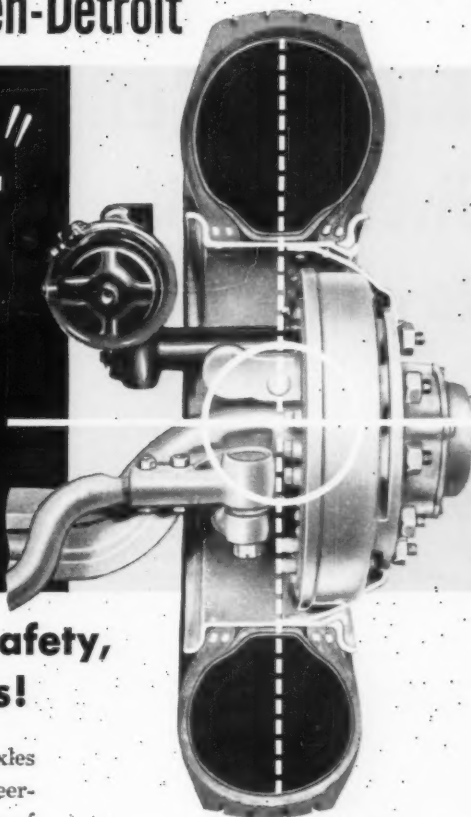
With Center Point Design the king pin is perpendicular to the ground, and is moved outward into the wheel. This puts the centerline of the tire and the centerline of the wheel on a relatively common plane. Because the king pin is in a true vertical position, it eliminates the heavy front end "load lifting" that is normally required when turning the conventional axle.

Steering resistance is thus greatly reduced, at no sacrifice in vehicle control. Drivers become less fatigued, safety is increased. And because road shocks and lateral pressures are transmitted more directly to the axle beam, tires and steering parts last longer . . . maintenance costs and downtime are reduced.

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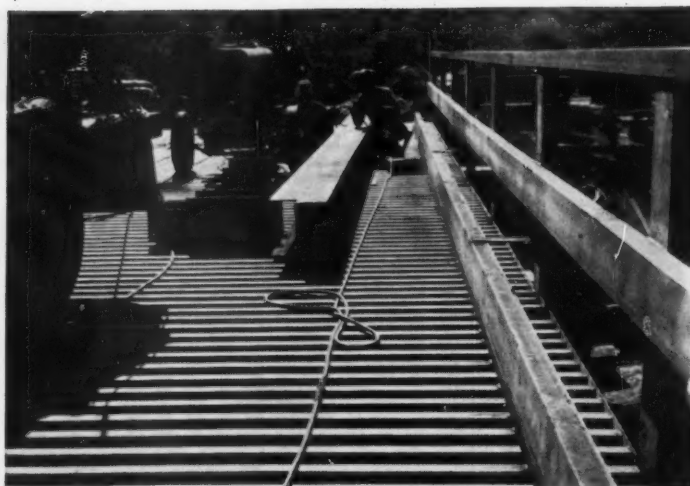
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STEEL BRIDGE FLOOR

Gives New Life to Old Bridges



The Bethlehem bridge floor over this bridge in Pennsylvania will require very little maintenance.



Steel bridge floor over the solid wood stringers of this rural Tennessee span resulted in a strong bridge.



Applying the first surface course on a rural Connecticut bridge. A second wearing course is also applied.

When the old flooring of these bridges needed replacing, the floors were stripped to the stringers, repairs made and new decks of Bethlehem Formed Steel Bridge Floor laid down. Result: strong, smooth, rattle-proof floors, requiring little maintenance.

In each case, Bethlehem Formed Steel Bridge Floor was easy to install. First, the worn planking was removed, then the Bridge Floor was carried from the stockpile, where it nested compactly in small piles, to the bridge. After proper positioning, the 2-ft-wide corrugated steel plates were welded to the stringers, and adjacent plates welded together. In the case of wooden stringers, the steel floor is easily attached with lag screws and washers.

After a surfacing material was applied, the new floors met all strength specifications of the American Association of State Highway Officials' standard specifications for highway bridges.

For complete information on Formed Steel Bridge Flooring, phone the nearest Bethlehem sales office.

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2500 lb. lift — $\frac{3}{8}$, $\frac{3}{4}$ and 1 cu. yd. tread width buckets among many attachments. **5500 lb. breakaway** — Unmatched pry-out capacity... no stalling in banks or frozen piles. **22° bucket roll-back**... Less spillage in transport... carry bucket low for greater stability. **5" flat-bucket, below grade digging** — "Float" valve relieves down pressure when desired for grading, leveling. **24" reach at 8' 5" dump height** — Big clearance over any standard truck side... load entirely from one side. **"Red Tiger" engine** — Biggest, most powerful ever made by Ford... choice of gasoline or diesel.

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The all new Ford is a glutton for punishment!

Heavy duty tractor — 7,000 lb. rated capacity front axle assembly... cast malleable combination grille and bumper... full length load-carrier frame. **Super-Duty Loader** — Rigid diagonal bracing eliminates bucket sway... tapered box section lift arms of lighter, stronger steel alloy to reduce dead weight... large, replaceable, heat treated pivot pins and bushings... all cylinder rods heat treated and chrome plated for long wear... most hydraulic lines internal, protected.

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The all new Ford provides easy, effortless operation!

Exclusive full hydraulic steering — Separate hydraulic system gives instant response, takes less than one turn of wheel to full left or right... cable controlled steering valve eliminates kickback... no mechanical parts to maintain. **Special steering wheel** — Slip clutch permits steering from any position, easily changed for stand-up driving... out of way in mounting tractor, shifting gears and using loader controls. **Foot throttle** — Pre-select operating speed with hand throttle, use overriding foot throttle to speed loading cycle... frees one hand for loader controls. **Shuttle shifting** — Simple reversing transmission is factory-installed option for quick back-and-forth shifting. **Superior visibility** — No steering rods, radius rods, etc., to obstruct vision along sides... diagonal loader braces eliminate cross bracing, permit dramatically low design with no part of rig extending above top of steering wheel.

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**THE HEART OF ANY
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**And there's nothing
on the market
to match the new Ford!**

Exclusive "Universal" system — oil reservoir, pump, heat exchanger, and valve required for loader, backhoes, other attachments — is an integral protected part of the tractor . . . exclusive features include forced air heat exchanger to keep oil cool, micronic filtering, sealed, ternal-plated sump to keep oil clean, and positive circulation to eliminate efficiency robbing cavitation. **Stack type control valves** — Give up pressure, down pressure and "float" position . . . positive valve feathering for instant, controlled response . . . safety and relief valves cushion tractor-loader from shock loads . . . extra attachments easily added . . . All of this is in addition to Ford's Hydraulic System for control of rear-mounted attachments and Ford's completely hydraulic steering system.

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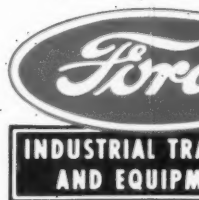
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- 2 New Ford Industrial Tractor series 1801
- 3 New Ford 10', 12', 14' Backhoe line coming soon! series 713.

New Ford gives you mud-slogging, flat-torque power!

46.5 belt H.P. and 42.1 drawbar H.P. in gasoline models; 41.5 belt H.P. and 37.75 drawbar H.P. in diesel models (Manufacturer's rating).

New Ford combines plenty of work weight with "turn-on-a-dime" mobility!

Short wheelbase with low center of gravity gives excellent stability. Basic shipping weight of approx. 3800 lbs. can be increased to full weight-bearing capacity of rear tires (28" cast iron wheel discs, optional, add 1200 lbs. to rear wheels; tire fill adds up to 900 lbs.; ring-type wheel weights can be added as desired).

New Ford offers wide choice of wheels and tires!

Standard 7.50 x 16 8-ply front tires are on steel disc type wheels with 5.50 x 16" rims. Rear tires offer choice of 12 x 28 (standard), 13 x 24; or 14 x 24 with cleat or button tread.

New Ford saves time, reduces waste motion!

Convenient instrument and control cluster includes Proof-Meter, standard on all models. Bucket position indicator takes the guesswork out of bucket spotting . . . speeds up loading cycle.

New Ford cuts fatigue, spurs production!

Comfortably upholstered seat with back rest and optional all-weather cab give your operator a break, as does the wide-open, step-on mounting to tractor seat. Models 1841 and 1841-D are equipped with Ford's 3-point linkage and hydraulic system for effortless instant control of rear-mounted attachments.

New Ford offers full line of attachments!

Heavy, medium and light material buckets — all tread width with long, tapered cutting edges and curved backs for easy, efficient bucket filling. Also material fork, dozer blade, crane, and rear counterweight box for front or rear use. Quick 4-pin changing.

New Ford gives you multi-job versatility!

Ford's new line of matched and integral industrial tractors and equipment will include 10', 12' and 14' backhoes and heavy duty dozer and rear blades . . . all due at your dealer's soon — and more on the way!

New Rigs Speed Concrete Paving

This article is based on excerpts from a speech delivered before the Portland Cement Association's Paving Engineers Conference by H. A. Radzikowski, chief of the Division of Development, Office of Operations, Bureau of Public Roads. It was prepared in collaboration with John J. Laing, chief of the Road Equipment Branch of the Division of Development. Last May, CM&E published excerpts from a speech Mr. Radzikowski delivered at the Asphalt Conference held at Ames, Iowa.

A Bureau of Public Roads expert reviews recent advances in equipment and methods that enable contractors to lay down huge quantities of portland cement concrete in record time.

AS WE EMERGE from the preliminary stages of the most ambitious highway construction program in history, it might be well to review recent progress in portland cement concrete paving equipment and practices and to take a glance into the future.

To begin with, there have been notable developments in equipment used to grade and compact the foundation courses that support portland cement concrete slabs (CM&E, April, p. 113).

Batching equipment for both aggregates and cement also has undergone considerable improvement in recent years. Today's big electronically controlled, automatic batchers are operated by one man—sometimes even the truck driver—merely by pushing a button. Because quantities of coarse and fine aggregates for various design mixes can be changed instantaneously, batchers can handle several projects at the same time.

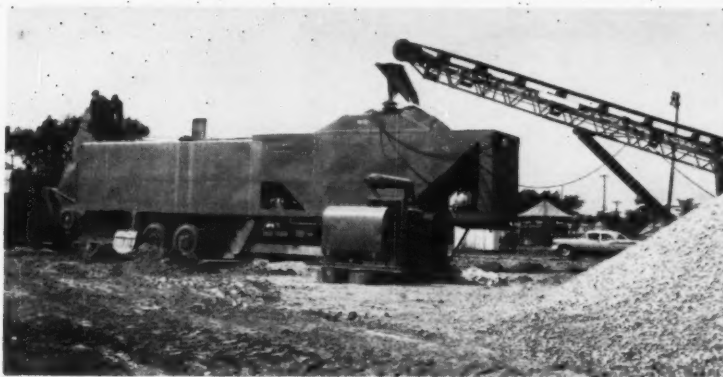
Because the new batchers provide such fine quality control, one state highway department has indicated in its construction specifications that automatic batchers will be required on all its concrete paving projects after January 1, 1960.

Another interesting development in the batch plant field is the new trailer-mounted portable concrete batcher that is also fully automatic. This plant holds 39 yd of aggregates, 280 bbl of cement, and 650 gal of water. Once the weigh beams and water pointer are set, along with the repeater for any desired number of batches, the measuring and discharge processes can be started with the push of a button.

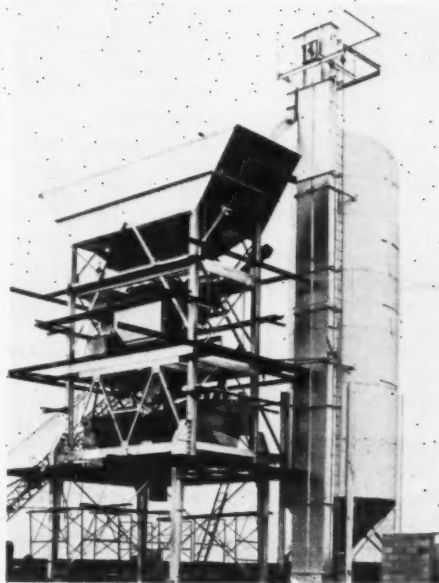
The newest innovation in concrete mixing equipment is the turbine-type mixer of Swedish design. It has been introduced in this country in sizes up to 1½ cu yds (CM&E, Aug., 1957, p. 214). This donut-shaped unit, with its paddles revolving in a horizontal plane, is capable of producing a homogeneous mix in 30 sec.

Without wheel or crawler mounting, the unit is low and compact. After it is charged outside the paving area, the mixer is transported by a small crane during the mixing cycle, and the completed mix is deposited from the bottom discharge gate. Two 1½-yd mixers of this type should be able to place a considerable volume of concrete per day if charging and discharging procedures can be streamlined.

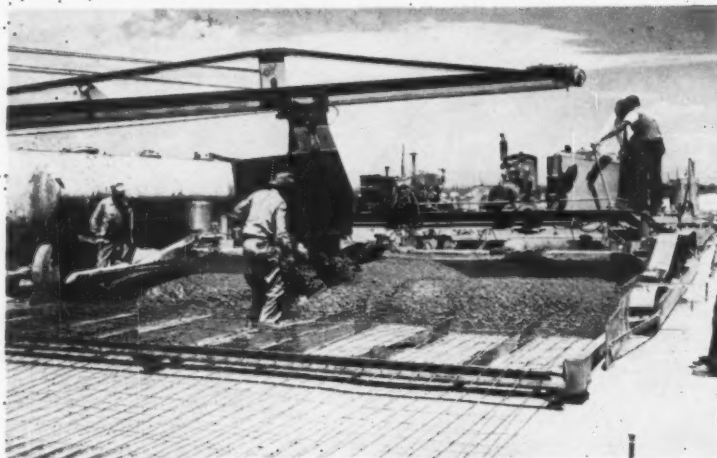
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PORTABLE—Johnson's Portable Batchers is an automatic, high-capacity batch plant that can be disassembled into three trailer units. It carries 30 yd of aggregate, 288 bbl of cement, and 650 gal of water.



QUICK MIX—T. L. Smith's turbine mixers, shown installed in batch plant, can turn out a homogeneous 1½-yd mix in 30 sec. The donut-shaped mixers have paddles that revolve in a horizontal plane.



CONTRACTOR'S IDEA—Breakthrough in slip form paving came when contractor developed sled-type device to lift reinforcing mesh so he could place concrete in one pass.

The Slip Form Paver

The slip form paver is a relatively new and far reaching development in the concrete paving field. Several types have been developed in the last decade, but only one crawler model has undergone continuous improvement that appears to assure its widespread acceptance.

Ordinarily, when we speak of a paver for laying concrete pavements we are actually referring to concrete mixing equipment. Now a lay-down machine is available; it performs the same functions as a bituminous paver-finisher. If the slip form paver continues to gain favor we may need some change in equipment nomenclature; the impression that two types of "pavers" are required for concrete pavement construction is misleading.

The slip form paver is essentially a single-pass machine that combines spreading, vibrating, tamping, finishing, and belting operations. In addition, the paver hauls its own forms. The stability of the newly poured concrete prior to its initial set is due to the simultaneous application of vibration and compression to a closely controlled harsh mix.

The one-man-operated slip form paver not only eliminates the forms and equipment and manpower for setting and pulling the forms; it also makes unnecessary such single purpose equipment items as spreaders, transverse finishers, and longitudinal finishers—all of which require individual operators.

The slip form paver has been used successfully on both concrete base and finished pavements. Savings on pavement costs range up to 40 cents per sq yd or \$7,000 per mi of 24-ft slab.

Riding quality is not being sacrificed by the slip form method. An excellent smoothness (80 in. per mi when measured by the Bureau of Public Roads roughometer) was obtained on a finished non-reinforced concrete pavement placed on a soil cement foundation in Colorado last year. This compares favorably with the smoothness of pavements constructed with carefully placed forms.

By using a motor grader with automatic blade controls and by adopting electronic controls to the paver itself, it should be possible to obtain even better adherence to the planned profile and cross-section of pavement. At the same time it might be possible to eliminate such units as a fine grader or planer from the already abbreviated slip form paving spread. Our development division is working with equipment manufacturers who are testing abbreviated grading and paving spreads capable of producing better end products at reduced costs.

Until a few months ago it appeared that the potentials of slip form pavers for portland cement concrete could be realized only on non-reinforced concrete slabs. But last summer a Colorado paving contractor discovered how to incorporate wire mesh reinforcement into the newly formed slab in a single-pass operation. An

experimental 1-mi long concrete paving strip was laid on Interstate Route No. 25 near Denver (CM&E, Nov., p. 82).

Specifications called for the mesh to be placed 2 in. from the top surface of the 8-in. slab with the method of achieving this placement left to the ingenuity of the contractor. The contractor developed a sled-type device that was attached to the forward arms of the slip form paver. As the slip form paver moved forward at speeds of 3 to 5 fpm, the sled device lifted the mesh up from the grade on to runners. Concrete then was dumped from the paver bucket in front of and close to the strike-off blade of the slip form paver. As the strike-off blade moved forward it pushed the concrete ahead and down through the mesh. After this, the regular vibration, tamping, and extrusion of the concrete took place.

Pavement placed by this method is strictly homogeneous; it is not layered. If the subgrade is prepared carefully, the slump of the concrete held consistently low, and good curing and sawing practices followed, the slip form paver with the sled attachment is a time and money-saving piece of equipment that produces an entirely satisfactory reinforced concrete pavement.

Although this initial try at placing wire mesh in a slip form paving operation was considered quite satisfactory in Colorado, placing techniques can be improved to a considerable extent as a greater volume of reinforced slip form paving is undertaken.

This is a major breakthrough in concrete paving progress, but it will be necessary to overcome some lesser problems to realize its advantages on a widespread basis. In some states it will be necessary to rearrange the cradles for dowel bar supports or to design some new load transfer device that will permit the ready placement of wire mesh in the single-pass paving operation.

Conventional Pavers

While new paving equipment developments are gaining considerable attention at present, we don't want to overlook improvements to the old reliable pavers and supporting units.

Nearly all pavers are now of the high-capacity, dual-compartment type that operate from out-

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B-352

NEW RIGS SPEED CONCRETE PAVING ... continued

side of the forms rather than on the subgrade. The automatic cycle begins when the skip leaves the ground and starts the first batch. Raising the skip starts the water and activates the batch-meter. Mixing in the first drum proceeds while the skip is being loaded for the second batch.

Initial loading is always in the first drum. Before the skip again reaches the top, all materials have been transferred from the first drum into the second so that mixing in both drums can proceed when the second skip is unloaded.

Discharge from the second drum can be made only when the preset mixing time has elapsed. Hydraulic or pneumatic controls have been added to nearly all paver functions, including steering and brakes. Drum designs have been improved so that a more homogeneous mix is achieved. Dispensers for introducing air entrainment agents are standard. Stub-nose skips have been devised to eliminate the possibility of introducing foreign matter into the mix from the wheels of the batch truck.

Paver Mixing Time

These improvements in paver-mixer design have been field tested and accepted by a majority of the states, but there appears to be some unresolved views in about one-fourth of the states as to the relative performance of the modern dual-compartment paver (34E) as compared with the older 1-yd pavers (27E). These states demand mixing times 25% to 100% longer than the 60-sec cycle recommended in the AASHTO specifications that were adopted several years ago. A 50% increase in the 60-sec mixing time results in a production loss of about 25%.

Comprehensive tests conducted long ago by the Bureau of Public Roads on single drum pavers, including the 27E size, show that good quality concrete can be produced in 45 sec if equipment is in good mechanical condition. Nothing can be achieved by mixing concrete longer than 60 sec.

Advocates of longer mixing time offer such explanations as: satisfaction with the concrete produced by the higher mixing times (which are based largely on tradition in the states involved); the shortage of qualified paving inspectors; and the tendency to undermix.

None of these reasons appear to be valid in view of the preponderance of evidence that points up the ability of modern pavers to meet specifications with a mixing time of 60 sec.

To recheck the concrete paver mixing cycle with the most modern practices and equipment now available, the Physical Research Division of our Bureau, in cooperation with 11 state highway departments, conducted tests on dual-drum pavers earlier this year.

Mixing times of from 30 to 120 sec were tried in the tests. Complete results have not been reported, but available test data verify the adequacy of a 50 to 60-sec mixing cycle for dual-drum pavers carrying the overloads normally recommended by equipment manufacturers.

Some participants in the tests who require the longer mixing times already have indicated a willingness to reduce this requirement and to permit overloads that previously were prohibited. It is hoped that, when the full test results are made available, other states will revise their specifications to provide for the shorter mixing cycles.

Better Screeds, Tampers

Other improvements in conventional paving spreads include vibrating screeds and tampers on spreaders and finishers for handling the drier mixes; improved equipment for placing and removing forms; and the introduction of sprayers for applying liquid curing compounds.

The California Division of Highways has been using a positive action tamper for a number of years. Several new models have been developed in the last 3 to 4 years as attachments to finishers, and their use is becoming widespread. These tampers do not replace the pan type vibrators but supplement them in consolidating concrete.

The positive displacement furnished by these tampers provides additional force and depth over that derived from the conventional types that have the tamper unit mounted on springs. The positive action tampers permit the use of drier mixes, particularly those containing crushed aggregates.

Another relatively new piece of equipment is the concrete saw

that utilizes diamond or silicon carbide cutting discs. Narrow ($\frac{1}{4}$ in.) sawed joints tend to eliminate spalling, reduce maintenance, and produce smoother riding qualities.

The use of sawed grooves to form both longitudinal and transverse joints creates a problem when hard aggregates such as chert gravel are used. Several methods are used to separate the stone to form a weakened dummy joint composed of mortar.

A vibrating joint-forming machine has been developed for pours up to 24 ft wide. (CM&E, Sept, 1957, p. 153.) Riding the form behind the longitudinal float, it has a vibrating bar that forms the transverse slot and a steel disk that forms the longitudinal dummy joint. After the dummy joints are made, the wet concrete surface is smoothed over by a steel straight edge and broomed or belted.

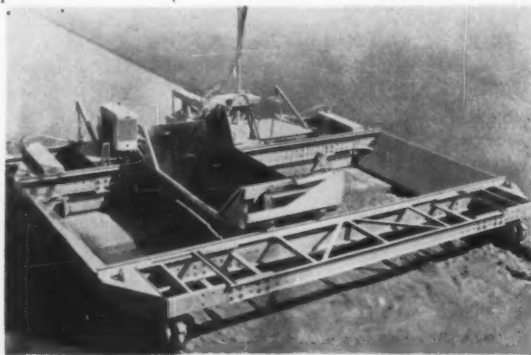
Preforming joints in this way permits sawing in hard-aggregate concrete at a cost that is competitive with sawing concrete containing limestone or other soft aggregates.

Ready-Mixed Concrete

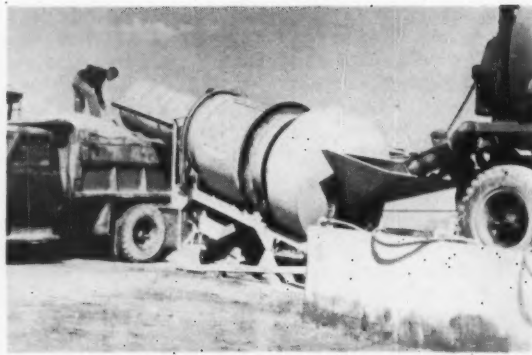
There has been an increase in the use of ready-mix, both from central plants and truck mixers, in the postwar period. Available information indicates that over one-half of the states are using this type on pavements. In one



PREPARES JOINTS—Seaman-Andwall's Vibro-Joint Cutter has a vibrating blade that separates aggregate from mortar at joints. Then saws can cut concrete easily.



BUCKET SPREADER—The bucket opening controls flow rate from Maxon spreader. Bucket's height controls slab thickness.



CUTS WASTE—Worthington's aggregate recovery machine takes unused truck batches and recovers sand and aggregates for reuse.

state, ready-mix yardage comprises about 75% of the total volume of paving concrete. All indications point to a further increase in the use of ready-mix.

Two factors undoubtedly will have a considerable influence on its increased use: the large volume of concrete paving generated by the expanded highway construction program; and improvements over present ready-mix techniques and equipment.

Some states using ready-mix are demanding better uniformity and a higher quality end product, particularly for transit mixes. In most areas the volume of paving concrete is only a small percentage of the total volume of ready-mix, and a problem exists in obtaining mixes that meet highway paving requirements. The equipment used in the transit-mix industry varies to a considerable extent in design; an effort is being made to have it conform more closely to the standards normally demanded of equipment used by highway paving contractors.

One manufacturer of ready-mix trucks has made an extensive study of factors that determine the quality of low-slump, truck-mixed concrete used in paving. These include methods of loading and the number of drum revolutions needed to mix concrete adequately. In general, these extensive tests show that the best uniformity is obtained when the water was introduced first at the batching plant. The tests also show that in most instances a minimum of 50 revolutions of the drum (5-yd size) was needed to assure uniformity. A mixing rate of 7 to 8 rpm produced the best results.

New developments in controlling the uniformity and slump of central plant-mixed concrete point toward an accelerated use of this type for concrete paving if problems associated with hauling and depositing the mix can be overcome. Now highly sensitive moisture meters that determine moisture content in individual batches are available, as is a device that automatically controls the slump of concrete without regard to variations in moisture content of the aggregates. This device takes into consideration the fact that the torque required to turn the mixer varies with the slump.

There is also the problem of controlling segregation when concrete is dumped. This problem can be solved to a great extent by employing some kind of spreading equipment to receive and place the ready-mix discharge.

Only a few months ago a new spreader for receiving ready-mixed concrete made its appearance on several paving jobs (CM&E, Aug., p. 152). This unit has a bottom discharge spreader bucket that operates on transverse runners. It can be positioned on either side of the forms for loading. After it is loaded, the bucket moves transversely across the subgrade and places a predetermined thickness of concrete that is controlled from the bucket opening.

Normally, the bucket is returned to the loading side after the spreading pass. Concrete placement can be retarded, stopped, or started at any point. As the spreader moves forward, the adjustable strike-off screeds the concrete longitudinally. All

movements of this new spreader are hydraulically powered.

A conveyor belt model that has been used during the last few years is undergoing extensive improvements. A pilot model now in use shows great promise for the efficient spreading of concrete received from truck chutes or dump bodies. It is capable of placing a 20 to 25-ft slab of either single or two-course design. Two longitudinal conveyors, which use the steel forms as a monorail, are located in front of and behind a third transverse conveyor mounted in a cross frame. The longitudinal conveyors are capable of receiving two truck loads of concrete simultaneously.

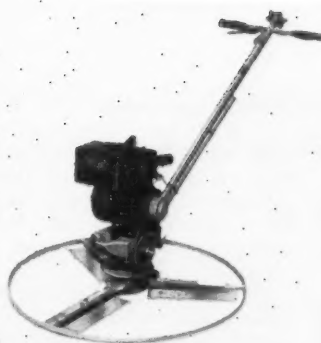
The concrete carried by the longitudinal belts is deposited on the transverse conveyor just inside the forms. Here it is deposited evenly as the belt travels between forms in front of a strike-off. The machine has a placing capacity of 3 to 4 yd per min.

Another of the problems associated with transit-mix operations in urban areas is the disposal of partial or full batches of mixed concrete that for some reason cannot be placed. Disposal costs of this residual concrete run as high as \$20,000 per year for individual ready-mix firms in some cities.

Now a reclaiming plant has been developed by a concrete paving equipment manufacturer that separates aggregates from the mixture by a combination of pressure washing and screening. The first unit has been installed at a central mix plant in Washington, D.C. After processing, the coarse aggregate is actually cleaner than when originally



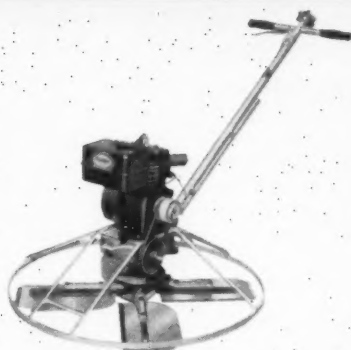
MODEL M-G Small, for light construction. 29" dia. Combination floating-fining trowels. Gas. (M-E, Elec.)



MODEL JA-G Medium machine for general use. 34" dia. Float trowels snap on. Largest selling model. Gas.



MODEL JA-E One of the four electric models. 34" dia. For average size jobs. Snap-on trowels for floating.

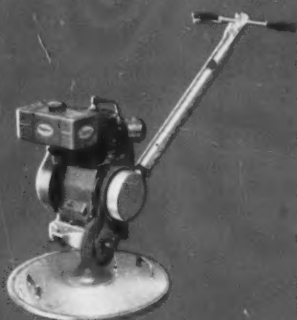


MODEL JA-4G For average jobs. Four trowel design. 34" dia. Combination trowels. Fixed ring. Gas. (JA-4E, Elec.)

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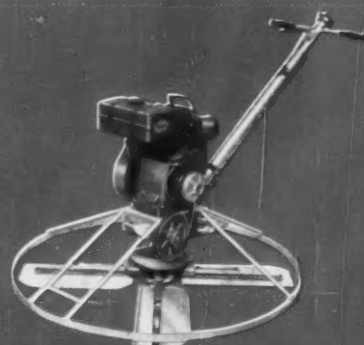
MODEL BA-G For finishing large areas. 44" dia. Snap-on trowels for floating. Gas. (BA-E, Electric.)



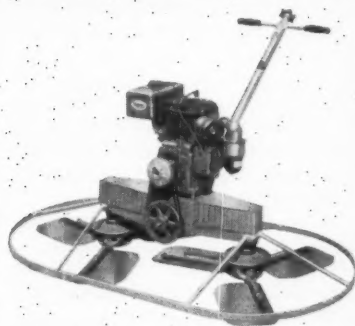
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NEW RIGS SPEED CONCRETE PAVING... continued

used, and it can be returned to stockpiles.

Additives

Not so many years ago the use of admixtures with portland cement concrete generally was discouraged. Today, it is recognized that a number of additives are capable of improving the end product, particularly its durability. Perhaps the most successful of the admixtures have been the air-entraining agent. Their al-

most universal adoption in areas subject to freezing and thawing has proved to be the most significant development in concrete paving technology since the 1930's.

Durability and high resistance to freezing and thawing, as well as to chloride salts, can now be built into concrete pavements with assurance. Calcium chloride and several proprietary compounds have been used successfully for cold weather protection.

There are indications that the silicone solutions form an effective water repellent and minimize icing, particularly on concrete bridge slabs. Silicones have a high resistance to oxidation and the property of reversing the capillary attraction for water.

Final judgment on the long-term benefit of these protective coatings will have to wait on the long-term performance of a number of concrete pavements and bridge slabs that have received silicone treatments in the last several years.

End-Result Specifications

Most concrete paving contractors operate with the benefit of years of experience. For this reason, it might be desirable to consider means by which this experience could be used to a great extent. Most states put only an end-result limitation on such things as compressive strength and profile smoothness. But for many other parts of the paving operation they specify the procedure that the contractor must follow.

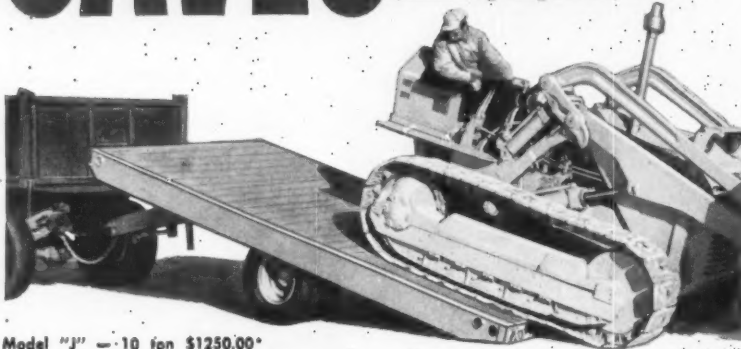
Studies are being made to determine how much emphasis could be placed on end-result specifications for thickness, strength, profile, and the finish of concrete pavements, along with essential limits of material quality and control. Any step in this direction must, of course, take into consideration the fact that it is all but impossible to make field corrections after placement.

New Testing Equipment

There are several developments in testing equipment that should not be overlooked. First, in connection with pavement foundations, a nuclear instrument has been developed that rapidly and accurately determines subgrade density and moisture. This device depends on the way radioactivity is scattered when placed in contact with materials of different moisture content or density. Measuring the amount of scatter is equivalent to measuring moisture content or density. Results are read directly from a calibrated chart.

A measure of the average surface density to a depth of 6 in. is obtained without probes merely by placing the base of the instrument on the surface. Beyond that depth, moisture and density

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NEW RIGS SPEED CONCRETE PAVING...continued

probes must be inserted into a pipe casing. This instrument was developed in conjunction with the Corps of Engineers and has been field tested at the AASHTO Road Test at Ottawa, Ill.

The Chase air meter for measuring the approximate air content in plastic concrete with known mortar content is another testing device for field use that has been developed only recently. The simple apparatus consists primarily of a tapered glass tube and a rubber stopper that can be carried easily in a pocket. Tests for approximate air content can be completed in about 3 min.

Other new instruments are the Kelly ball for measuring concrete consistency and the California Highway Division's Profilograph, a device that records vertical deviations of pavement.

Future Needs and Prospects

Considerable credit is due to those who are responsible for the new methods, practices, and equipment that I have described briefly. Equipment manufacturers are not prone to rest on their laurels. They continue to explore zones where new developments are needed and where the mechanization of present processes can be made more efficient.

One big problem that must be solved is the relatively slow truck batching and paver charging techniques now in use. In many cases, they prevent a paver from achieving its full production capacity. An entirely new concept for streamlining field batching and charging—either with trucks or some other type of loading unit—appears to be needed.

Current studies in paver mixing times undoubtedly will show that drum size is not the controlling factor in establishing paver mixing cycles. This could lead to the development of larger pavers for on-the-job mixing purposes.

Consideration is being given to the development of pavers as large as an 81E size (3 yd) that could produce batches more than twice the size now turned out by the 34E paver. If an 81E paver is found to be practical, field batching and paving charging advances will follow. Once a need is established, the equipment manufacturers can be depended upon to provide for it.



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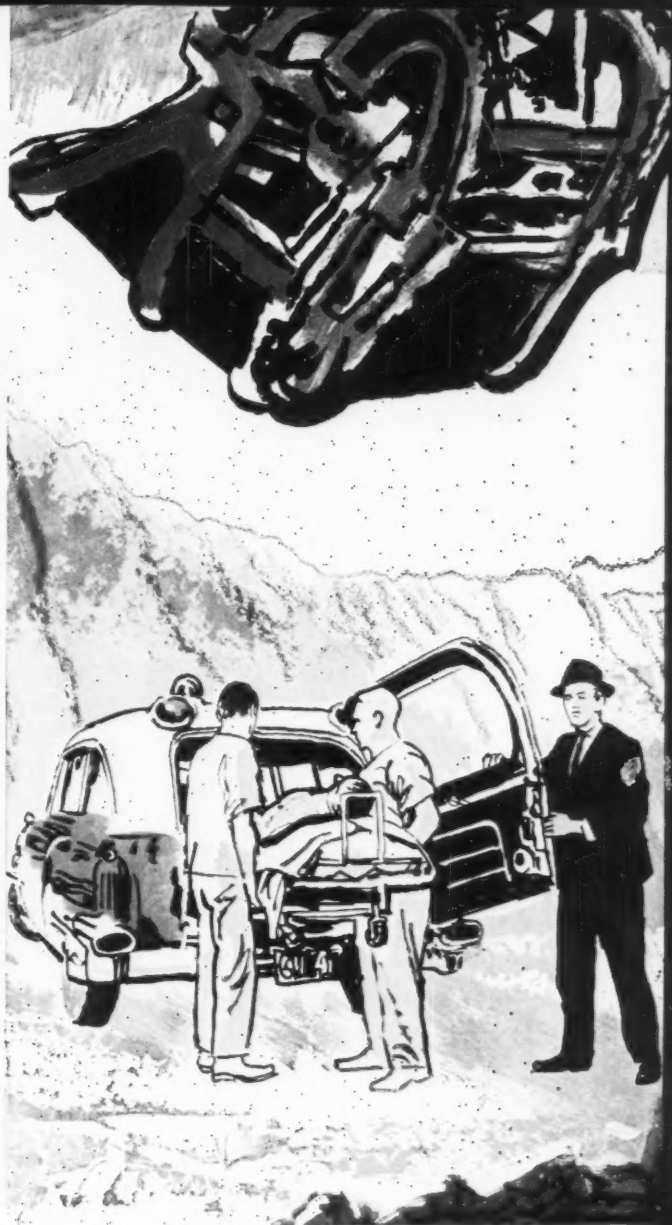
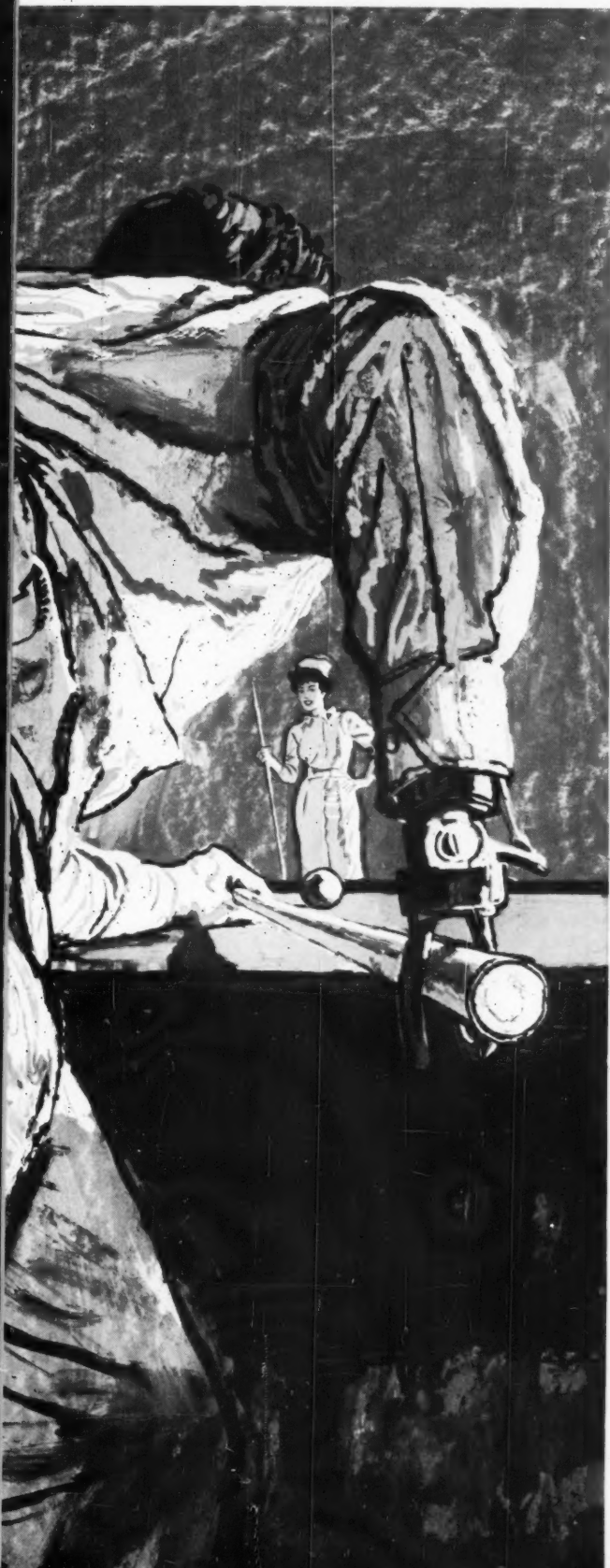
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For more information about these and other Richmond Lifting Inserts send for the Richmond Data Book on Lifting Inserts. And if you have any specific concreting problems ask us about them.



Construction Men in the News...



Moles Name Award Winners

JAMES F. ARMSTRONG (left) of New York City and JOHN BRUCE BONNY of Boise, Idaho, will receive the 1959 awards for "outstanding achievement in construction" from The Moles, a society of heavy construction men. Armstrong and Bonny will get the nineteenth in a series of achievement awards that started in 1941. Numbered among its winners are former President Herbert Hoover, Robert Moses, Admiral Ben Moreel, Peter Kiewit, Harvey Slocum and Lou Perini. The Moles make the awards annually to one member of the society and one non-member.

Armstrong, the member winner, is vice president of the Peter F. Connolly Co. and has been in heavy construction more than half a century. Most of his work has been in the field of pneu-

matic caissons for bridge foundations. Besides Connolly, he has been associated with the Arthur McMullen Co., Senior & Palmer, Inc., and Walsh Construction Co. in some of the most important bridge installations around the New York City area.

Bonny, the non-member awardee, is vice president and general manager of the Morrison-Knudsen Co., Inc., which carries on worldwide operations from its Boise, Idaho headquarters. Since 1952 Bonny literally has commuted between the United States and French Morocco, Iran, and Iraq. He also travels each year about 200,000 air miles in this hemisphere. He has been with M-K since 1931.

Formal presentation of the honors will be made at the annual Moles' Awards dinner in New York early next year.

Corps of Engineers

LT. COL. THOMAS F. SPENCER joins the Corps of Engineers' Eastern Ocean District where he will serve as area engineer at Keflavik, Iceland. He will supervise the Corps' construction of facilities for the Navy and the Air Force.

MAJ. GEN. CHARLES G. HOLLE, special assistant to the Army's Chief of Engineers, retires after 41 years service. He has been eligible for retirement for the past eight years but elected to stay on the job as long as he

could and permit the retirement decision to be made by Army regulations. He will continue, however, as a working U.S. member of the St. Lawrence Joint Board of Engineers where he serves as secretary of the Army's alternate.

Perini

ELIOT FARLEY, JR., is new executive vice president in charge of administration and finance of the Perini Corp., Framingham, Mass. He also becomes a member of the firm's board of directors.



IT WAS LAID AT 102 FPM on a Morrison-Knudsen job in Wyoming

Ask the Morrison-Knudsen crew about the mat they laid on U.S. 30 near Wamsutter, Wyoming. *Outstanding* is the word for it... perfect in uniformity, density and smoothness.

While you're at it, ask them about the over-all performance of the Cedarapids Paver that laid this perfect mat at laydown speeds up to 102 feet per minute. Once again, the word is *outstanding*!

And that's the word you'll find all over the country describing the Cedarapids Bituminous Paver. No need to make a trip to Wyoming! Just ask Cedarapids Paver owners in your State (your Dealer will give you their names) about the speed, mat perfection, and inspector-acceptance this advanced-design Cedarapids machine will bring to your job.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

Cedarapids

Built by
IOWA

**BITUMINOUS
PAVERS**

GIVE YOU ALL THESE OTHER BENEFITS, TOO

- High capacity—Paver easily handles 200 tons per hour—keeps your hot-mix plant going full blast.
- Maximum density—3600 screed vibrations per minute assure maximum density at any paving speed. Rapid vibration "irons" the mat into uniform textured, smooth, dense surface, without tears or voids.
- Automatic material-depth control—prevents voids—relieves operator from constant attention to depth of material in front of screed.
- Less maintenance required—efficient electrical controls and drives eliminate many troublesome wearing parts.
- Easiest operation—Simple finger-tip controls on one panel—no confusing, fatiguing forest of levers and pedals—operator can concentrate on laying perfect mat!
- Unique crawler action and oscillating track rollers permit paving over obstructions—manhole covers and uneven spots in the grade—with screed maintaining a level plane.

Rome Disk Plowing Harrows



Rome Master Disk Plowing Harrow takes a deep cut, turning material over so that excess moisture can evaporate.

BUILD *ideal* SUBBASE for roads, airports and dams

For faster, more efficient pulverizing, aerating, blending and stabilizing of subbase materials put a Rome Disk Plowing Harrow on your job! Here's the weight and design to cut deep — pulverizing action to thoroughly mix the subbase and return material to its original position — free from ruts or windrows — the ruggedness to match the power of the largest crawlers.

Rome Disk Plowing Harrows are ruggedly-built for heavy-duty construction work. Massive main frames hold gangs level and make them penetrate uniformly. Super-strong bearings — your choice of Timken Roller or White Hard Iron — hold blades rigidly in position, provide easy rolling action. Notched blades are the finest made to withstand the punishment of rocks and stumps. Rome Disk Plowing Harrows are available in a variety of widths, in both offset and Rome Master Tandem. You have your choice of mechanical, hydraulic or cable control angling methods as well as wheel-type offsets in certain sizes.

Get all the facts at your Rome-Caterpillar Dealers.

ROME PLOW COMPANY, Cedartown, Georgia

YOUR ROME DEALER IS YOUR CATERPILLAR DEALER

Sales and Service

Equipment purchasing and servicing takes less time when you know who and where to call. Keep advised of new distributors, sales personnel and other activities.

Distributor Appointments

Koehring Company: The Kwik-Mix Company division has appointed The Hayden - Murphy Equipment Co. of Minneapolis, Minn., as distributor for its construction equipment in southern Minnesota. Products to be handled include bituminous, plaster-mortar, and concrete mixers, the Moto-Bug, and the Hi-Lifter fork truck.

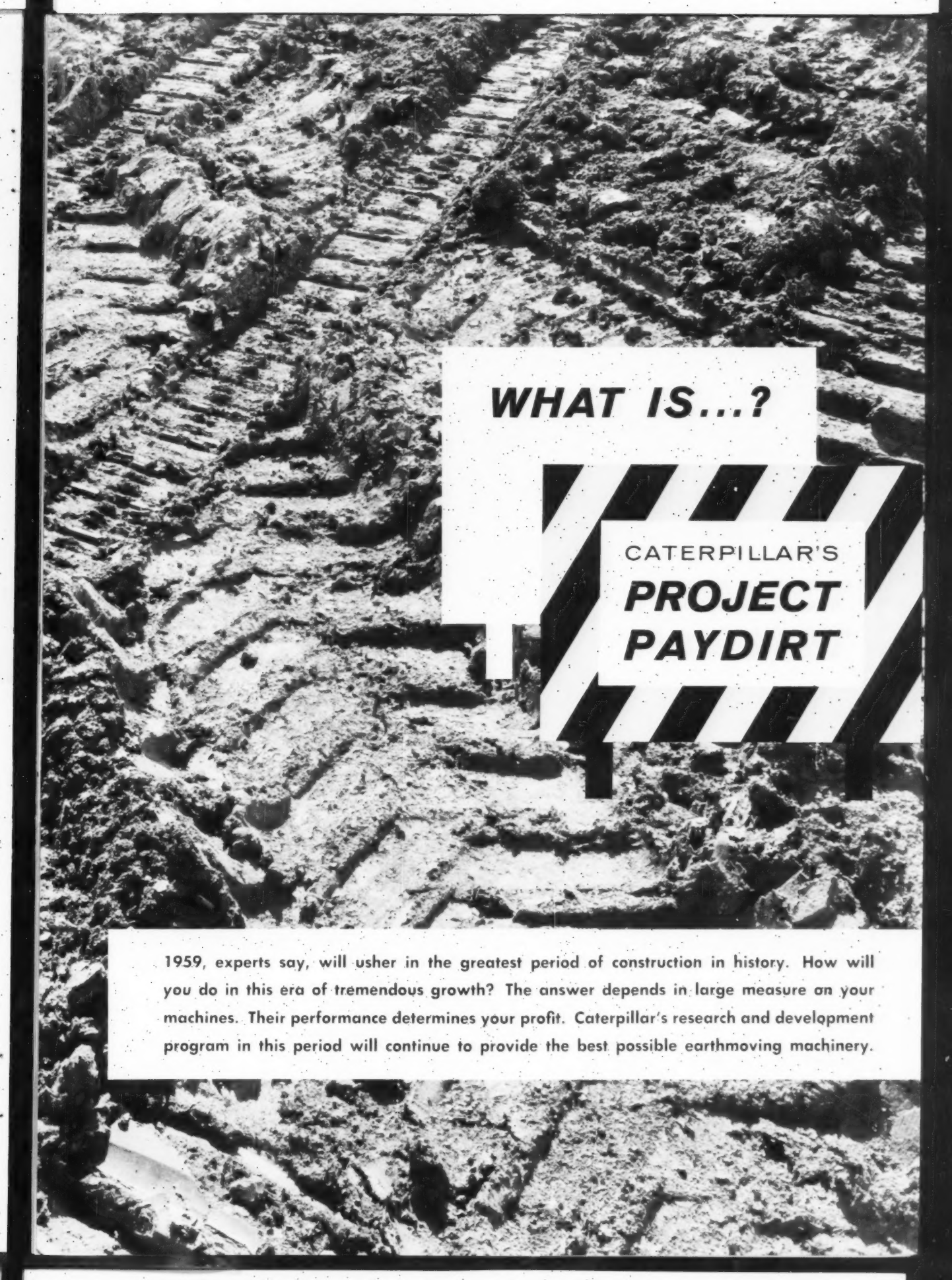
Poor & Company: Pioneer Engineering Division has appointed three new equipment distributors. W. I. Clark Co. of New Haven, Conn., will cover the state of Connecticut and four counties in western Massachusetts. Industrial and Farm Equipment Corp. of Chester, Pa., will cover southeastern Pennsylvania and southern New Jersey. Field Machinery Company of Cambridge, Mass., will cover eastern Massachusetts and Rhode Island.

Baldwin - Lima - Hamilton Corp.: The Construction Equipment Division has appointed Lutherville Supply & Equipment Co. of Lutherville, Md., as distributor for its crushing, screening, and washing equipment for the District of Columbia and the state of Maryland.

Worthington Corp.: The following five distributors have been appointed: Southwest Equipment Co. of Phoenix, Ariz.; R. G. Smith Equipment Co. of Des Plaines, Ill.; Heil-Chicago, Inc. of McCook, Ill.; Lumby Machinery Co. of Dallas, Tex.; and P-D Service Syracuse Corp. of East Syracuse, N. Y.

Clark Equipment Co.: West India Machinery and Supply Co. of San Juan, Puerto Rico, has been appointed distributor for "Michigan" construction and bulk ma-

continued on page 117



WHAT IS...?

CATERPILLAR'S
**PROJECT
PAYDIRT**

1959, experts say, will usher in the greatest period of construction in history. How will you do in this era of tremendous growth? The answer depends in large measure on your machines. Their performance determines your profit. Caterpillar's research and development program in this period will continue to provide the best possible earthmoving machinery.



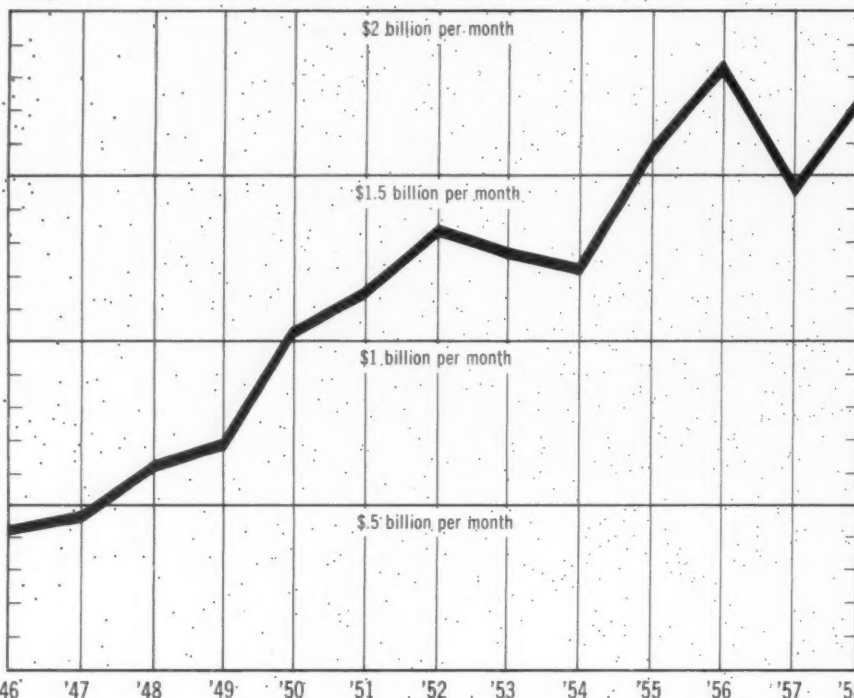
Project

CATERPILLAR RESEARCH AND DEVELOPMENT

A multi-million-dollar research and development program at Caterpillar Tractor Co. is paying off for you in the most productive earthmoving equipment ever manufactured. It's PROJECT PAYDIRT—the big news in the construction field today.

Caterpillar research consistently has been first with the major developments in earthmoving equipment. Each development has meant more production and more profit for owners of Caterpillar machines. Since 1946 the money spent on heavy construction

GROWTH IN U. S. HEAVY ENGINEERING CONSTRUCTION



Source: U. S. Dept. of Commerce

SHARP INCREASE of money spent in U.S. on heavy engineering construction, both public and private, is shown in this graph. In 1946, a monthly average of \$431 million in heavy engineering construction contracts was let. In the first eight months of 1958, contracts averaged nearly \$2 billion (\$1,717 million). By 1975, average monthly contracts of approximately \$3.5 billion are expected.



HERE'S WHAT PROJECT PAYDIRT MEANS TO YOU!

As the amount of construction increases, more contractors will enter the field; and competition for the work will be intense. Machines may be the difference between profit and loss. There will be no place for anything but modern, heavy-duty machines—machines that can perform profitably, day in and day out, under severe conditions.

Caterpillar has these machines, a full line of quality, job-tested earthmoving equipment. And PROJECT PAYDIRT insures that the Caterpillar line will always be ready for the job ahead, regardless of changing condi-

tions and demands. Proof of this lies in the past record.

Since the end of World War II the Caterpillar line has experienced a continuous growth. And in 1951 the DW20 and DW21 were introduced. These wheel-type tractors soon proved ideal power units for scrapers. Also from PROJECT PAYDIRT that year: the No. 90 Scraper, top producer with track-type tractors; and the HT4, a track-type, hydraulic front-end loader.

The workhorse D8 Pusher, designed especially for push-loading applications, was introduced in 1953; along with

Paydirt

PACE GROWTH IN HEAVY CONSTRUCTION

in the United States has more than doubled. By 1975, experts predict, it will more than double again. Between now and then may well lie the country's greatest era of construction.

PROJECT PAYDIRT is Caterpillar's answer to the

challenge of this explosive growth in heavy construction.

Money spent on heavy construction in U. S. has risen since 1946 from \$5,172,000,000 to more than \$20 billion. Experts predict that by 1975 annual expenditures will rise to more than \$40 billion.



the No. 6 Shovel and the DW15, a smaller four-wheel tractor. 1955 brought the massive D9, king of the crawlers, equally effective as a bulldozer or for pushloading scrapers.

Also in 1955 came the three Traxcavators (Nos. 977, 955, 933), and the LOWBOWL Scrapers (Nos. 470, 456, 463), top producers that competitors still are trying to duplicate.

The Oil Clutch began setting new long-life standards in 1955. Also introduced in that year were other LOWBOWL Scrapers (Nos. 428, 435, 491), and tractor-mounted hydraulic Rippers (Nos. 4, 6, 8, 9).

In 1957, the Side Dump Bucket was offered as an at-

tachment for the No. 955 Traxcavator, resulting in greater production through in-line loading. In the bulldozer line, the revolutionary Gyrodozer for the D7 Tractor began its career as the most versatile blade yet developed. PROJECT PAYDIRT was producing the equipment to match the growth in engineering construction.

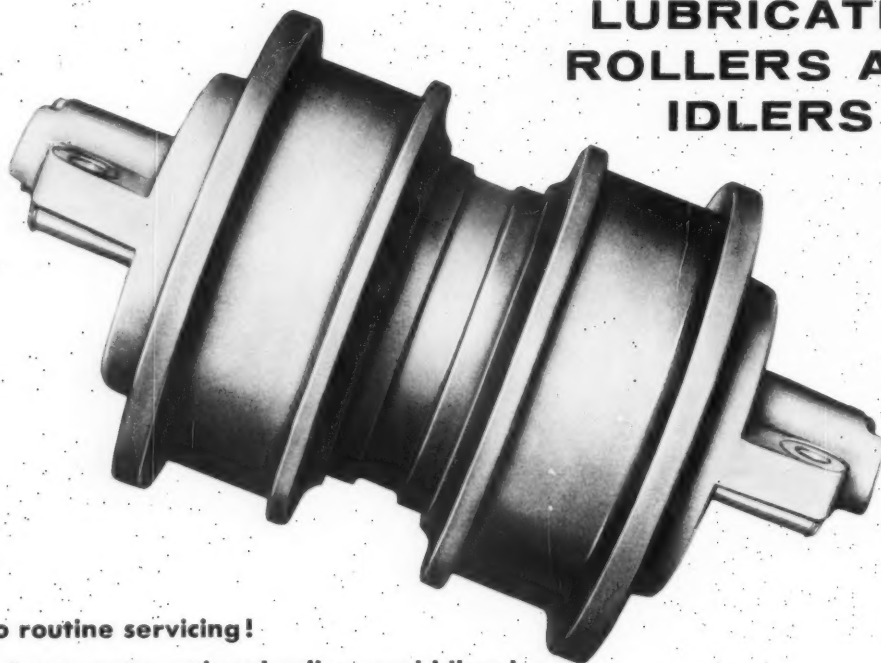
The new Dry-Type Air Cleaner for the D9, DW20 and DW21 was introduced last month. This air cleaner removes 99.8% of all dirt in the intake air. And it requires only 5 minutes instead of the 20 formerly required to service the oil-type cleaner. That's 15 minutes more production time at each service period.

AND NOW

CATERPILLAR'S
**PROJECT
PAYDIRT**

BRINGS YOU...

LIFETIME LUBRICATED ROLLERS AND IDLERS



- **No routine servicing!**
- **Outwear conventional rollers and idlers!**
- **Feature new leakproof seals that can be re-used!**

Three million test hours under the toughest conditions prove this fact: new D9 lifetime lubricated rollers and idlers have no equals for low-cost, trouble-free performance.

Lubricated in the factory, they never need servicing again until they are rebuilt. They last far longer with less maintenance than conventional counterparts. Their new seals are leakproof and can be used again and again.

These outstanding advantages are the direct result of Caterpillar's new, exclusive concept in roller seal design—a metal to metal, floating ring seal.

Important as the new seal is, it is only one of many major improvements in the new D9 track roller. Major changes have also been made in rim, hub, bushing, outer sleeve bearing, roller shaft, end collars and lubrication system. These advances greatly extend roller life and effect

substantial savings when rebuilding is necessary. See your Caterpillar Dealer today. He has the full story on what the new lifetime lubricated roller can mean to you.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR

Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

**BORN OF RESEARCH...
PROVED IN THE FIELD**

SALES AND SERVICE . . .

continued from page 112

terial handling equipment in the Virgin Islands. Western Machinery Co. of Abilene, Tex., has been appointed distributor for the Texas counties of Hardeman, Foard, Knox, Haskell, Fisher, Jones, Shackelford, Nolan, Taylor, Gal- lahan, Coke, Runnels, Coleman, Irion, Tom Green, Concho, McCulloch, Schleicher, Menard, Sutton, and Kimble.

On the Sales Front

Atlas Powder Co.: Dale A. MacDonald has been appointed a sales representative in the San Francisco sales district.

Insley Mfg. Corp.: J. Leo Lamley has been appointed district sales representative in Olympia, Wash. His territory will include Washington, Oregon, Idaho, Montana, Alaska, British Columbia, and Alberta.

Motorola Inc.: Hoyt Stout has been named regional sales manager in New Jersey, Delaware, and southeastern Pennsylvania. He succeeds Wallace Miller who is now the New York State manager.

Upson-Walton Co.: J. A. Sulzmann has been appointed Cleveland district sales manager. He will continue to manage the Pittsburgh office as well.

Bucyrus-Erie Co.: Lewis C. Black has been appointed manager of domestic sales. He will be replaced as sales manager, large excavators, by Howard Freyensee. Phil Peterson has been appointed district sales representative for Hydrocranes, Hydrohoes, and Hydroshovels in the states of Pennsylvania, Virginia, West Virginia, Maryland, New Jersey, and the District of Columbia. Four other sales appointments are announced. They are: William G. Barnes, sales engineer—blast hole drills; Robert E. Cannon, service manager; Mark J. Janich, supervisor, parts and tool sales; and William G. Piper, supervisor, sales technical section.

Clark Equipment Co.: The Construction Equipment Division announces the following sales appointments: Alvin E. York, sales manager; Wendell V. Richards,

Get full power!



Transmit every pound of usable torque with J-M Friction Facings



Woven J-M Cone Facing being applied to a power take-off unit.

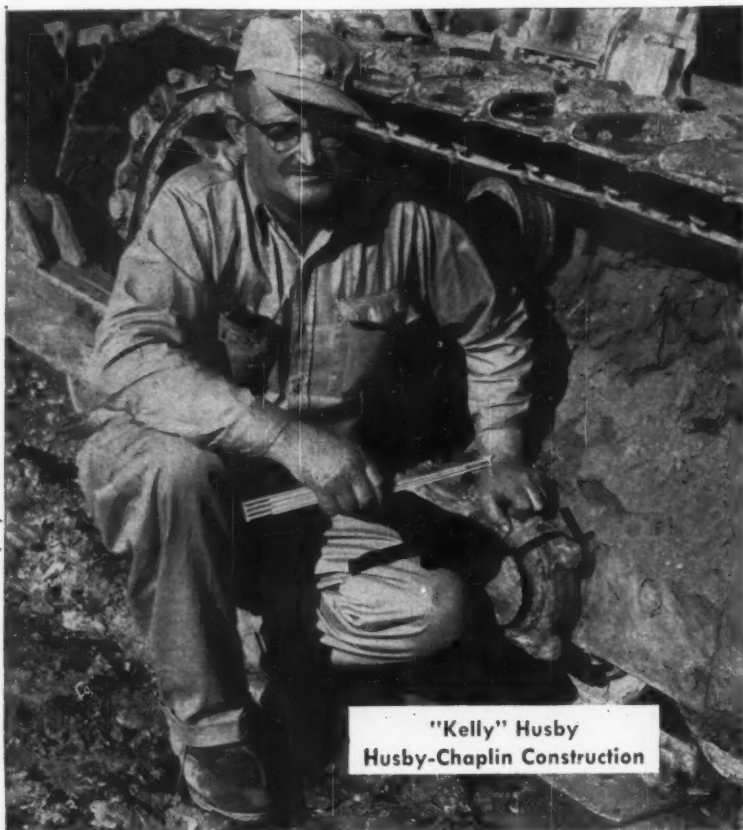
Heavy-equipment operators have discovered that Johns-Manville Friction Facings for clutches efficiently control the tremendous torque output of modern engines. These facings can withstand the searing clutch heats (as high as 1200° F) developed during power engagement . . . heats which can destroy friction ingredients and increase clutch slippage.

J-M Friction Facings, made of the finest asbestos fibers and resins, were specifically engineered for their job. They resist thermal breakdown . . . absorb and pass off sudden heat surges. They quickly bring drive shaft and power take-off units to fullest working torque, prevent loss of engine torque that robs your equipment of speed and power, makes your operation less profitable.

See your J-M Distributor or write Johns-Manville, Box 14, New York 16, N. Y. In Canada: Port Credit, Ont. Ask for Brochure FM 35-A.

JOHNS-MANVILLE
100 YEARS OF QUALITY PRODUCTS . . . 1858 . . . 1958





"Kelly" Husby
Husby-Chaplin Construction

**"Cut track overhaul costs? Sure!
We're having our tracks done on a
new OTC 'Trackmaster' track press
which doesn't broach the pin bosses!"**

"We expect about twice as much life out of each set of rails," says Clarence E. "Kelly" Husby, partner in the Husby-Chaplin construction firm in southern Minnesota, "because the OTC 'Trackmaster' hydraulic track press does not ruin the pin bosses, and we can keep rebuilding the rails. And this saves us money! As far as 'downtime' is concerned, there is another saving . . . because we get our tracks done faster, and keep our machines working."

SAVES MONEY IN OVERHAUL

Like contractor "Kelly" Husby, you can save money by having your tracks re-pinned on the new, fast OTC Trackmaster press. Ask your track repair man.



Write for additional information on OTC's
new "Trackmaster" hydraulic track press:

**OWATONNA
TOOL COMPANY**

380 CEDAR STREET OWATONNA, MINNESOTA

SALES AND SERVICE . . .
continued

assistant sales manager; B. Frank Reach, Jr., manager of the Central District; Paul McAdams, chief engineer for the Division; Gust J. Schwanke, manager of parts and service; Ralph H. Hall, assistant manager of parts and service; Wallace W. Post, Jr., manager of order and distribution; Jack B. Hart, Washington representative; Fred Dolton, district representative in New Jersey and New York City.

In the Main Office

The Garret Corp.: Harry Wetzel, Jr., vice president and manager of the AiResearch Manufacturing Division, has been elected to the board of directors of the company. He replaces B. N. Snow, who has resigned.

The Timken Roller Bearing Co.: Herchel M. Richey has been elected vice president in charge of manufacturing to replace A. M. Donze, who has retired. Mr. Donze will remain a member of the board of directors.

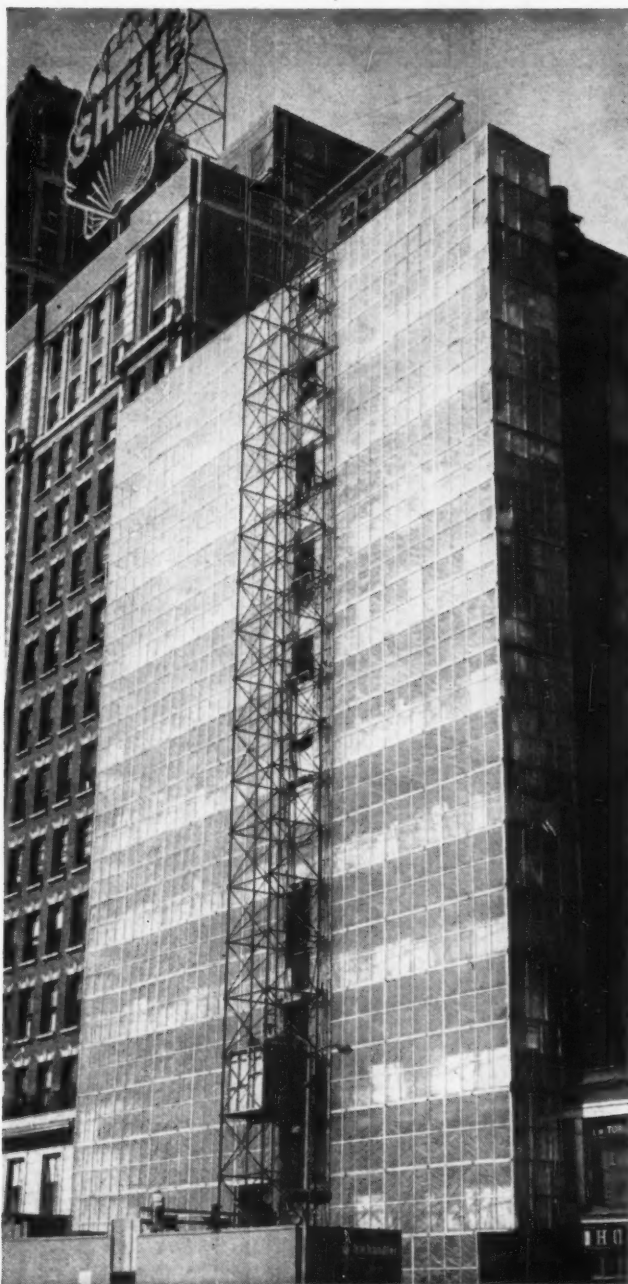
Bay City Shovels, Inc.: G. L. Sittser has been elected by the board of directors as executive vice president of the company.

Associations

Conveyor Equipment Manufacturers Association: J. B. Nordholt, Jr., president of Webster Mfg., Inc., was elected president of the Association at its 25th annual meeting this year. E. H. Woodberry, manager, Industrial Division, Lamson Corp. was elected vice president; L. J. Johnson, general sales manager, Mathews Conveyor Co. was elected treasurer; and E. E. Saperston, secretary and comptroller, Mechanical Handling Systems Inc. was elected secretary. R. C. Sollenberger was re-elected executive vice president to head staff operations in Washington.

Special Mention

Waukesha Motor Co.: The Dyson Corporation has acquired from The Oliver Corporation an important holding of common stock in the Waukesha Motor Company. This makes Dyson the largest single stockholder in the Waukesha Company.



Contractor Specifies

VISQUEEN film
TRADEMARK

for superior strength on windy city job!

B. W. Handler Construction Company's 10-story IBM building job in Chicago faced squarely into wind-swept Lake Michigan.

To prevent slow-down of work due to weather and wind . . . and to help guard against materials falling on passers-by on busy Michigan Avenue, Mr. Handler specified VISQUEEN film. He says:


"We used VISQUEEN polyethylene because it is an economical material to purchase. Our previous experience with it indicated it has adequate strength to serve the purpose for which it was used on this building. VISQUEEN film allows sufficient light through it, is durable, economical and waterproof and its light weight made erection of the wood frames to which it was fastened rapid and efficient."

FOR COMPLETE INFORMATION ON HOW BUILDERS EVERYWHERE ARE BUILDING BETTER AND SAVING MORE WITH VISQUEEN FILM, WRITE TO VISKING COMPANY, PLASTICS DIVISION.

BEWARE OF IMITATIONS: VISQUEEN film is specially formulated and manufactured for superior performance in construction applications. Look for the trademark VISQUEEN printed every foot on the film—for your protection.

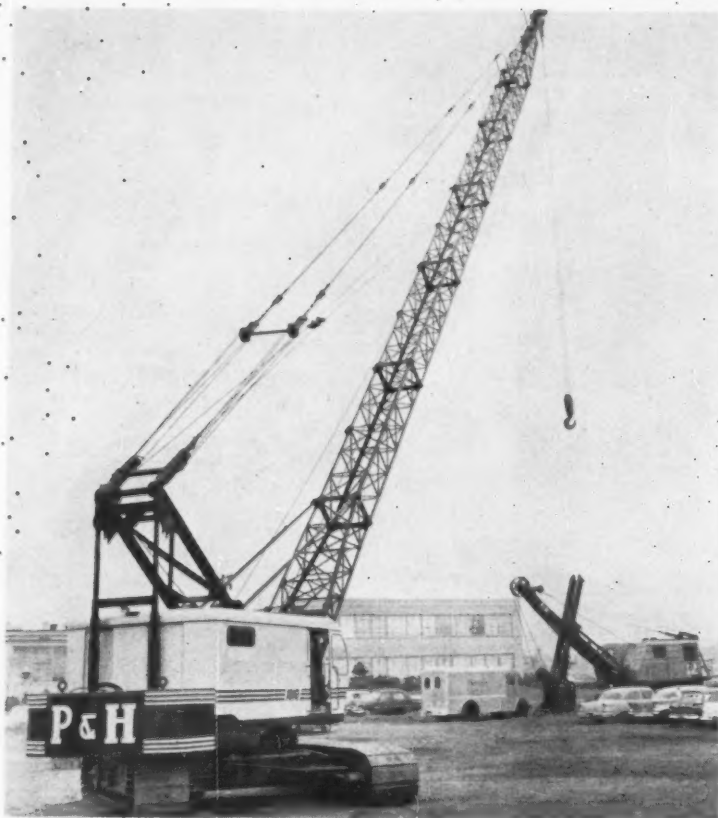
VISQUEEN film—first and foremost polyethylene film: A product of the long experience and outstanding research of PLASTICS DIVISION

VISKING COMPANY

P.O. Box CM12 Division of  Corporation
6733 W. 65th St.
Chicago 38, Illinois

In Canada: VISKING COMPANY DIVISION OF UNION CARBIDE CANADA LIMITED, Lindsay, Ont. VISQUEEN, VISKING and UNION CARBIDE are registered trademarks of Union Carbide Corporation.

Construction Equipment News...

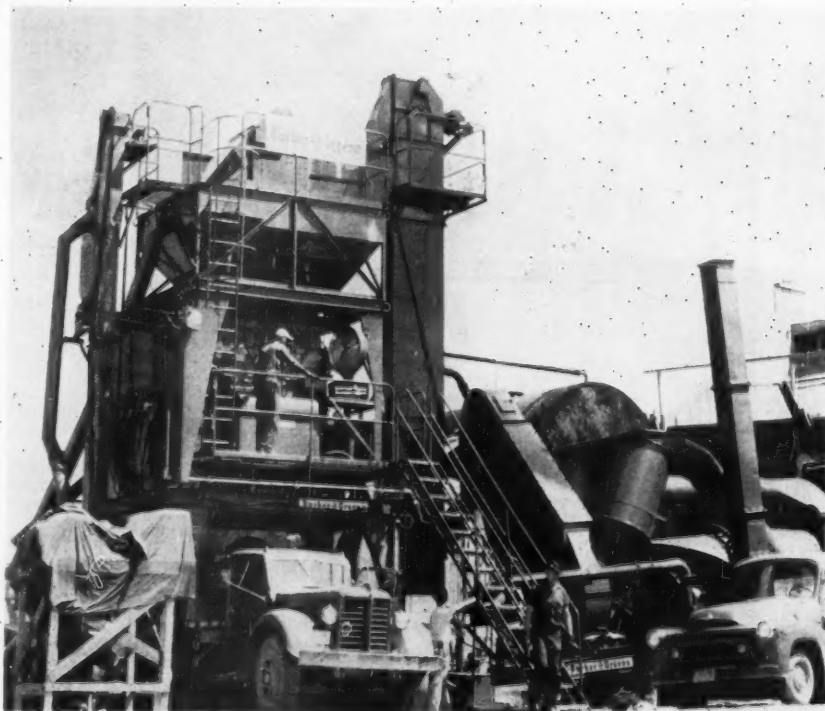


Wide Crawlers Support High Boom

The new P&H 1010 crane has a 16 5/6-ft wide crawler assembly that gives the machine the stability to handle 300 ft of light-weight boom for concrete work. The crane is rated at 100 tons with a 60-ft boom at a 15-ft radius. It can handle 200 ft of heavy-duty boom. Power for swing is transmitted electro-magnetically through P&H's patented Magnetorque—a design that does away with friction swing clutches and cuts maintenance. Another important feature is an independent planetary boom hoist with single direction cam clutches that gives the operator positive control of the boom.—Harnischfeger Corp., 4400 W. National Blvd., Milwaukee 46, Wis.

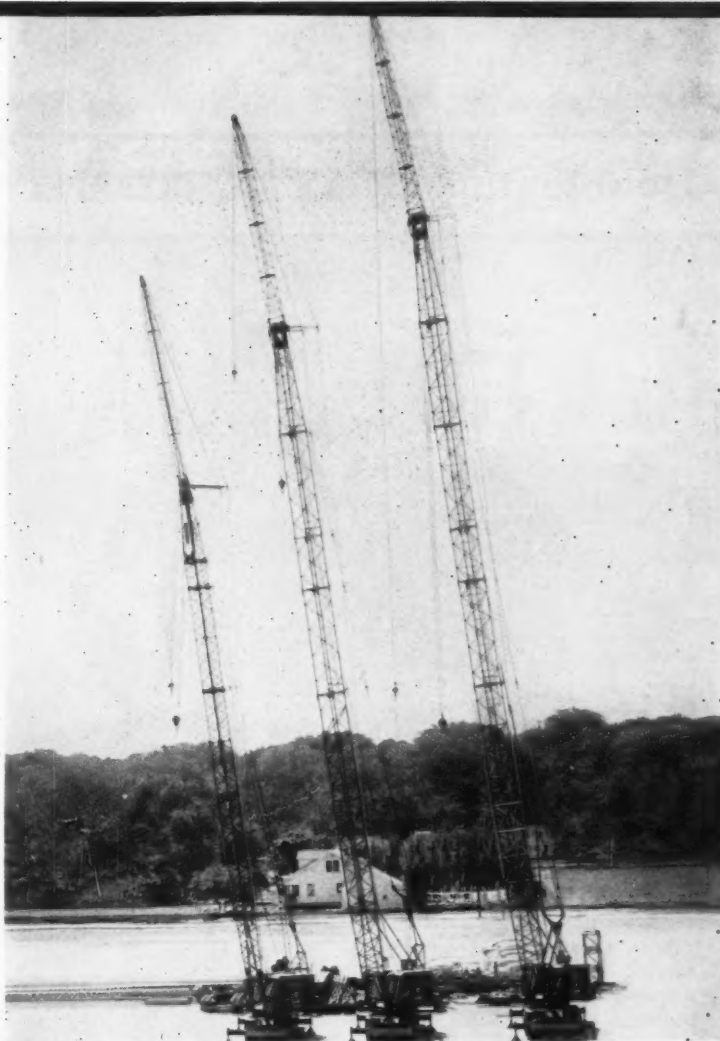
Big-Plant Features

Barber-Greene's two new asphalt batch plants—the 1,000-lb capacity model 890 and the 1,500-lb capacity 891—are basic four-bin units that incorporate many of the features of the company's largest Batchomatic plants. Both have the Batchometer asphalt measuring system that combines batch accuracy with push-button control. This system can be preset to deliver repetitive batches. Both plants have the company's hydraulically-operated Dyna-Mix pugmill, which allows the entire batch to rest below the center line of the two paddle shafts. Both models are equipped with a 3 1/3-deck vibrating screen.—Barber-Greene Co., 400 N. Highland Ave., Aurora, Ill.



Link-Belt Unveils New Truck Cranes

New truck cranes rated at 40, 35, and 30 tons have been added to the Link-Belt line. The 40-ton model HC-108A (far right) can handle up to 200 ft of Hi-Lite tubular boom and jib. Maximum boom and jib heights for the other machines are 180 ft for the model HC-98A and 160 ft for the 30-ton HC-88A. All three feature hydraulic controls, reversing clutches for either or both main drums, independent boom hoist and a boom-lowering clutch, pin-connected boom, and retractable high gantry. Carriers feature hydraulic power steering, removable outrigger boxes, and planetary rear axles. — **Link-Belt Speeder Corp., Cedar Rapids, Iowa.**



Scraper Hauls 48 Yards

Big capacity and plenty of power are key features of the new M-R-S 38-yd tractor-scraper combination. The 250HW scraper, which has a heaped capacity rating of 48 yd, is towed by a four-wheel, 600-hp tractor. The low-profile bowl is controlled hydraulically. Speeds up to 34 mph are delivered through a constant-mesh transmission. — **M-R-S Mfg. Co., Flora, Miss.**



Enters Earthmoving Field

Curtiss-Wright entered the earthmoving equipment field in a big way last month when it officially introduced a full line of scrapers with capacities of from 7 to 30 yd struck. Several rear dump wagons in sizes up to 35 tons were unveiled at the same time. Biggest self-propelled scraper in the 14-model line is the C-226 (left); a two-axle unit with a struck capacity of 26 yd and a

Double-duty **PAYLOADER**®



with the Superior Side Boom

Even seasoned contractors are amazed at the variety of work this tractor-shovel handles when equipped with exclusive Superior-Hough side-boom attachment. It combines rubber-tired mobility with light crane lifting capacity.

Being *side* mounted, boom operation does not interfere with bucket operation. Either boom or shovel work can be handled at will. No time lost to change attachments. Hydraulic operated boom telescopes from 10 to 16 feet, lifts up to 10,000 lbs.; bucket carry capacity is 9,000 lbs.

What's more, this "PAYLOADER" handles easily (power-shift transmission, power-steering) travels fast (up to 24 mph) to work profitably on widely scattered job locations in one day.

Write for more information on this versatile boom and other useful "PAYLOADER" attachments, and ask about "Hough Purchase and Lease Plans" too.



AS A SIDE BOOM, rubber-tired "PAYLOADER" strings pipe along trench, can lift, carry and spot heavy equipment, pull sheeting, work on curbs and sidewalks without damage.



AS A TRACTOR-SHOVEL, "PAYLOADER" backfills trenches, can clear and grade right-of-way, load excess spoil and do other materials handling jobs... all with boom secured to machine.

HOUGH

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
706 Sunnyside Ave., Libertyville, Ill.

Send SUPERIOR-HOUGH Side-boom data to:

Name _____

CM

Title _____

Company _____

Address _____

City _____

State _____

12-B-2

heaped rating of 36 yd. This rig is powered by a 375-hp General Motors diesel through an Allison automatic transmission and torque converter. Maximum road speed with a full load is 35 mph, according to the manufacturer. Struck capacities of the other new self-propelled scrapers are 7, 15, and 20 yd. Tractor-drawn models range from 8 to 30 yd struck. A feature of the new self-propelled scraper line is Curtiss-Wright's Roto-Gear steer—a hydraulic steering system that provides constant torque and finger-tip control throughout the 180-deg steering arc. The scrapers also have several ease-of-maintenance features including new front-hinged "tilt-up" hoods that gives quick access to the engine. Curtiss-Wright also showed another new off-the-road vehicle that combines the characteristics of a



light truck, a tractor, and a power source. Called the Unimog (above), it was developed by Daimler-Benz, A.G. of West Germany. The Mercedes-Benz product will be marketed in this country by Curtiss-Wright's South Bend Division. The Unimog, available in 1, 1½ and 2-ton models, has tremendous tractive power. It can pull 20 times its own weight, climb a 60-deg grade with a full payload, and travel at speeds ranging from .2 to 35 mph. It has four-wheel drive and a double differential lock that can be engaged without clutching or stopping the vehicle. This feature, combined with wheels mounted so that they can run in different planes, enables the rig to get through sand, mud, water, and other tough terrain. Standard engine in all three basic models is a four-cylinder water-cooled 35-hp

continued on page 126

PROFITABLE WINTER CONSTRUCTION, JOB AFTER JOB

Careful planning, skillful management, and Lehigh Early Strength Cement are the reasons for TERMINAL CONSTRUCTION CORPORATION's profitable year 'round operations—on job after job.

On this new Jersey City housing project, for example, work began in July of last year. Lehigh Portland Cement was used until the weather turned cold early in December. Then the contractor switched to Lehigh Early Strength Cement.

Here are some of the savings this contractor achieves by using Lehigh Early Strength Cement for winter construction: with less bleeding and earlier hardening of concrete, finishers are off the job sooner, forms are stripped in half the time required with regular cement, and winter curing costs are cut as much as two-thirds.

Use Lehigh Early Strength Cement and keep your jobs moving through the winter. It will help you speed operations and cut costs.



Currie's Woods Gardens housing project consists of two 13-story and five 14-story apartments. Work started July, 1957. Photo taken March 11, 1958.

LEHIGH PORTLAND CEMENT CO.

Allentown, Pa.

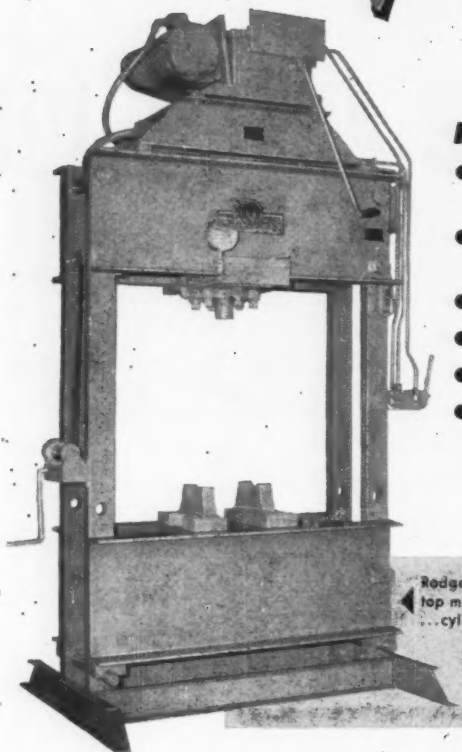
Architects: KELLY AND GRUZEN
Newark, N. J.

Contractor: TERMINAL CONSTRUCTION CORP.
Wood Ridge, N. J.

Concrete Supplied by:
HUDSON BUILDERS MATERIALS INC.
Jersey City, N. J.

Owner:
JERSEY CITY HOUSING AUTHORITY

A *Rodgers* Shop Press is **BEST** for **YOU!**

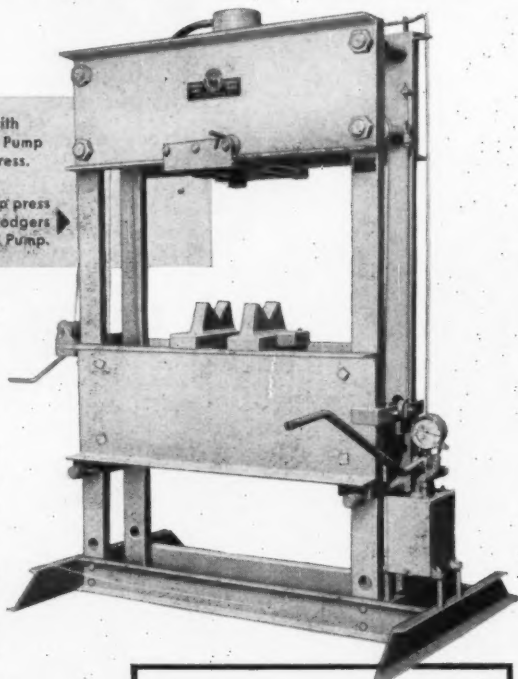


HERE'S WHY:

- **LONGEST RAM TRAVEL** with maximum hydraulic power throughout entire stroke.
- **REMOVABLE CYLINDER** for independent hydraulic power away from the press.
- **CYLINDER TRAVEL** full width of press, either way.
- **OPEN ENDS** allow long pieces to extend through sides of press.
- **EXTRA WIDE** inside work space to handle bigger jobs more easily.
- **GREATER STRENGTH** with heavy bar stock sides and pins—bearing blocks support bolster to give uniform distribution of pressure.

← Rodgers 100 ton shop press with top mounted Greenlee Power Pump... cylinder travels width of press.

Rodgers 100 ton shop press with Rodgers 2 speed Hand Pump.



WHEN YOU INVEST in a shop press it is more important to compare performance than initial cost!

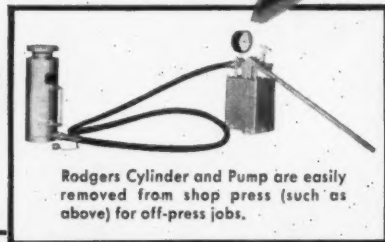
Rodgers Shop Presses are designed and built for the most versatile service, and longest trouble-free life. In the shop they handle hundreds of diversified jobs... pressing, bending, straightening, assembling. For field work the Rodgers cylinder and pump are easily removed from the press, making an ideal portable power unit for jacking, lifting, heavy shaft removal and similar work.

Rodgers produces the most complete line of shop presses available—capacities from 60 to 400 tons—in varied standard models with power pumps, top mounted or placed at the side—or hand pumps with 2 or 3 speeds.

When you compare shop press performance and cost you will find a Rodgers is best for you, too. Ask your Rodgers Representative for complete details—or write us.

SEND FOR **NEW CATALOG** ...

It gives useful information
and complete specifications.



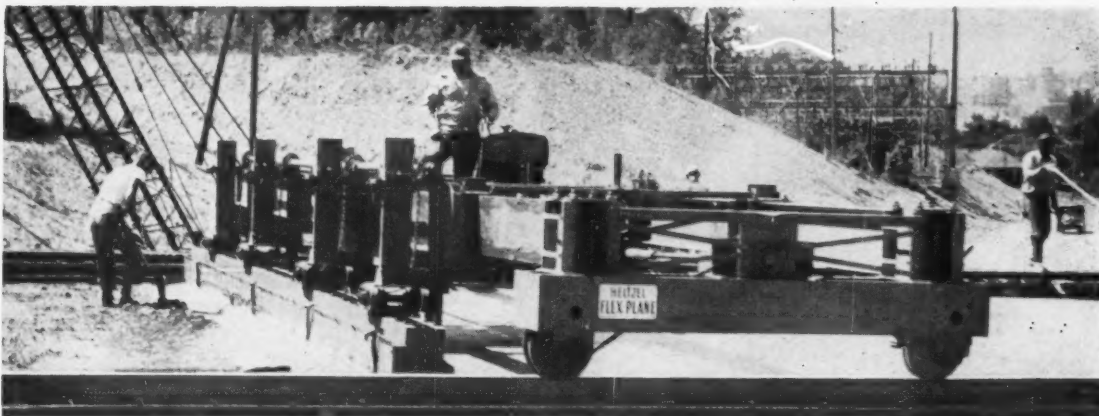
Rodgers Cylinder and Pump are easily removed from shop press (such as above) for off-press jobs.



RODGERS HYDRAULIC, Inc.

Pioneers in High Pressure Hydraulics Since 1932

7403 WALKER STREET • MINNEAPOLIS 26, MINNESOTA



New Bridge Deck Finisher Handles Wide or Narrow Slabs

Heltzel's new bridge deck finisher can be adjusted to handle slabs from 24 to 44 ft wide and with simple changes it also can contract to a 16 ft width. A new clamping system, which joins the machine's four principal parts, makes it easy to assemble, dismantle, and adjust the rig on the job. Individual hydraulic lifts raise and lower the screed from a position 24 in. below the riding rails to 4 in. above the rails. The screed drive can be adjusted vertically to secure the screeding angle that will give the

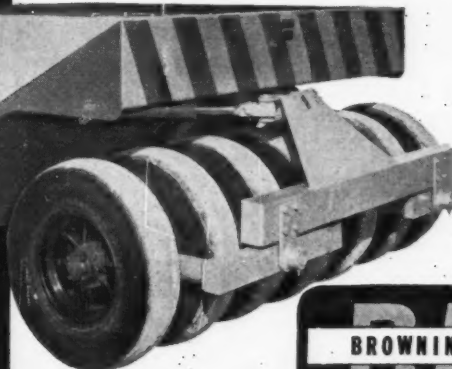
smoothest trowelling action. A quick-change device permits the screed to take any crown up to 6 in.—from flat to full arc. To make the screed easier to mount and adjust, it is hung with clamps instead of bolts. The finisher travels at speeds of from 3.5 to 13.4 fpm when screeding, and up to 48.4 fpm when not screeding. The lightweight rig is available with a rear screed and a hydraulically operated burlap drag.—Heltzel Steel Form and Iron Co., 1750 Thomas Road, Warren, Ohio.

**ANOTHER
BMCO
FIRST!**

13 WHEEL SELF-PROPELLED ROLLER



**MORE COMPACTION
FEWER PASSES
50% LARGER**



**NOW . . . YOU CAN CUT YOUR
COMPACTION TIME IN HALF!**

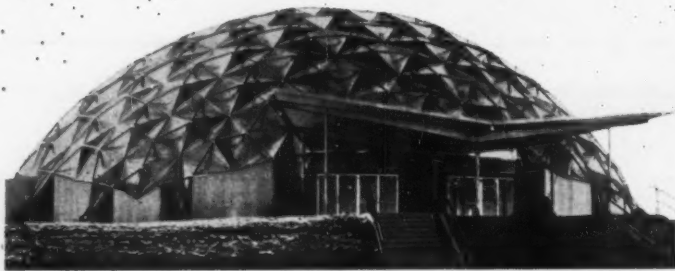
This new exclusive BMCO 13 wheel roller makes it possible for you to do the same amount of work in half the time!

With complete oscillation on all wheels and power steering this 13 wheel BMCO compactor is easy to handle. With the largest power unit in its class and extra displacement . . . this is the compactor for you in '58.

For more information write, wire, or phone!

BROWNING MANUFACTURING CO.

111 HUMBLE AVENUE P. O. BOX 2707
SAN ANTONIO 6, TEXAS



Radical New Building Erected from the Top Down, Using Beebe Winches

THIS UNUSUAL auditorium, of 16,500 square feet, in Borgner, Texas, was erected by Dale Benz, Inc., Phoenix contractor. Elapsed time from start to finish: 3 weeks!

This building, one of three in existence, is a radical departure in design. The aluminum dome is almost entirely self-supporting, without benefit of internal trusses. Kaiser Engineers and Dale Benz, Inc. designed and erected the geodesic dome. It consists of 365 7' by 11' panels cold riveted together. The complete dome rests on 25 tubular struts.

The dome is literally built from the top down. All work is done on the ground. As each tier of panels is finished, the completed portion of the dome is raised by a hoist tower protruding through the top. Four Beebe hand Winches on the tower provide the lift as each tier is completed. Other Beebe Winches at the periphery of the dome control sway cables that give the dome stability against the wind during construction.

Many new uses are being found for Beebe Winches in modern construction techniques, because only Beebe Winches combine maximum lifting power with low-cost, portability, and "sensitive" control.



Beebe Bros.

2730 Sixth Avenue South • Seattle, Wash.



Load-Rated* DOES THE JOB!



LIFTING 30-TON STATOR FRAME WITH CROSBY-LAUGHLIN Load-Rated HOOKS

Heavy lifts demand the safe performance of Crosby-Laughlin* **LOAD-RATED** Hooks. Quality materials and quality manufacture produce **LOAD-RATED** Fittings for heavy lifting-handling jobs where safety, dependability is essential. Safe working capacity is stamped on each **LOAD-RATED** Fitting. You order . . . get guaranteed capacity. More than 2000 items in the world's most complete line of drop forged fittings for wire rope and chain are fully described in catalog available from construction, industrial and mill supply distributors. Or write:

*Trademark

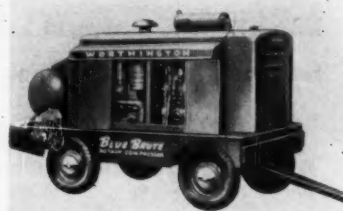


CROSBY-LAUGHLIN Division

AMERICAN HOIST & DERRICK COMPANY
FT. WAYNE 1, INDIANA

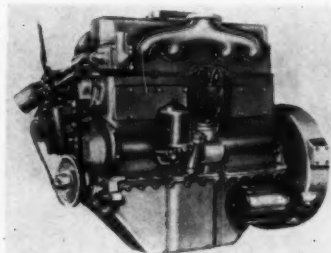
EQUIPMENT NEWS... continued

diesel, although a six-cylinder, 92-hp gasoline engine is available. Power take-offs located at four locations on the truck can operate more than 150 different accessories. These include a front-mounted 80-cfm compressor, electric generators, welding generators, hydraulically controlled backfill blades, and many other attachments.—**South Bend Div., Curtiss-Wright Corp., 701 W. Chippewa Ave., South Bend, Ind.**



New 365-cfm Blue Brute

A new 365-cfm Blue Brute rotary has been added to the Worthington compressor line, which also includes 125, 210, 315, and 600-cfm models. Featuring the Worthington "over-under" design, the new unit has the second stage compressor-cylinder directly over the first stage. The compact compressor comes with two filters—one a lifetime element and the other an inexpensive, replaceable final filter. The outboard end of each cylinder is exposed so that every moving part is accessible for servicing. The unit also has a clutch that allows the engine to be warmed up without engaging the compressor. Power is supplied by a Cummins NHC-400 diesel. — **Worthington Corp., Harrison, N.J.**



New Hercules Diesels

Two new high-speed six-cylinder diesel engines for applications that operate at speeds up to 3,000 rpm



**Mack Model LVX—22½-ton payload
rear dumper.**



**Mack Model LRX—15-ton payload
rear dumper.**

Send a man instead of a boy!

Big yardages—smashing impacts—heavy hauls. That's when you need a truck with the guts and go of these famous super-capacity Mack off-highway dumpers. No doubt about it, the man-sized jobs are the Mack-sized jobs.

Check the specs with your Mack representative—but remember, Mack quality begins where specifications leave off. And be sure to ask him about Mack users—names, facts and figures—who are handling their big jobs with these profit-earning big Macks.

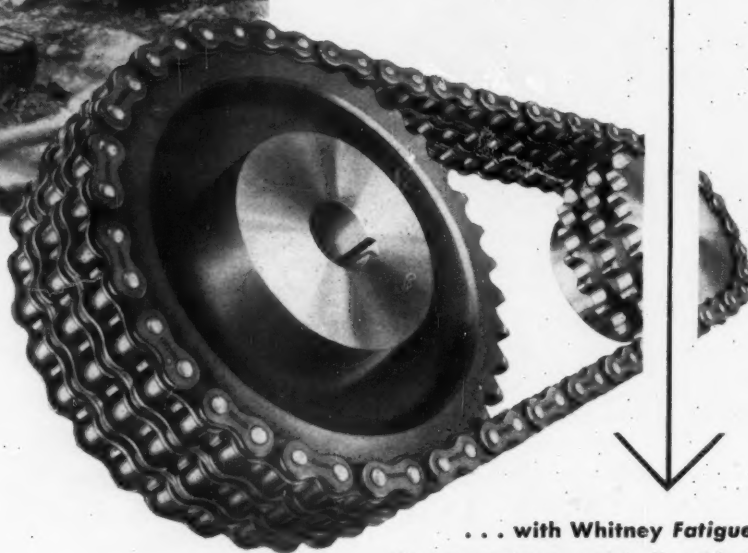
Mack Trucks, Inc., Plainfield, New Jersey.
In Canada: Mack Trucks of Canada, Ltd.

For capacities of 30 tons or more where maximum flotation and traction are required, a full line of tandem rear axle Macks is available.

MACK
first name for
TRUCKS



HIT PAY DIRT



... with Whitney Fatigue-Resistant Processed Roller Chain

This new advancement, combined with fine heat treated alloy steels and Whitney's rigid quality controls, is helping to keep construction on schedule profitably. With Whitney Roller Chain on your equipment, you get ruggedness to spare — assurance of new durability and freedom from downtime.

Factory trained Field Engineers are always available for practical recommendations on all of your chain and sprocket design problems.

And call on your local Whitney Chain Distributor to help you cut maintenance and downtime costs. He'll be glad to help you with fast, off-the-shelf service from a complete line of ASA roller chains and stock sprockets.



New . . . Whitney's packaging includes plastic enclosed disassembled chain parts for easy chain assembly, handling and parts inventory . . . another exclusive Whitney service!

Whitney

CHAIN COMPANY

314J HAMILTON STREET • HARTFORD 2, CONNECTICUT

ROLLER CHAIN • CONVEYOR CHAIN • SPRCKETS • FLEXIBLE COUPLINGS • WHITNEY-TORMAG DRIVES

have been introduced by Hercules. The new DDH engines are available in two sizes with 296 or 339-cu-in. displacements. The former provides up to 112 hp at 3,000 rpm and the latter is rated at 122 hp at 3,000 rpm. The new engines are particularly well-suited for engines using hydraulic torque converters that call for high engine speeds. Low weight to horsepower ratios make them ideal for many types of mobile construction equipment. Features include 2½-in. diesel fuel lines and 2⅞-in. main bearing diameters. — **Hercules Motor Corp., Canton, Ohio.**

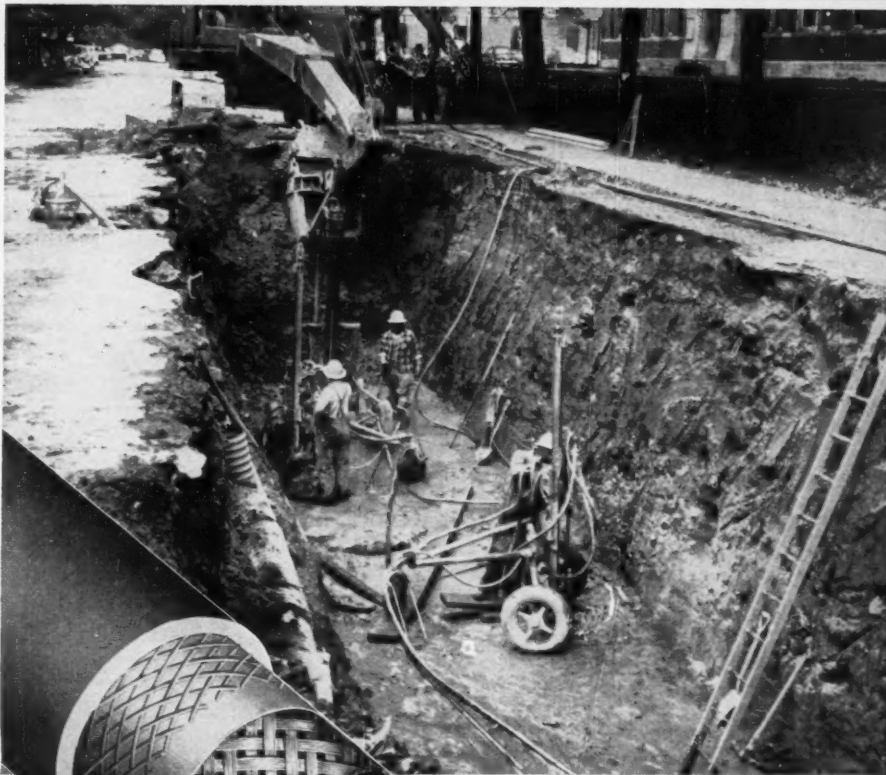


Meet Load Limits

Two new ready-mix concrete trucks, designed to meet area weight restrictions, have been added to the FWD line. The C6-547 (photo), with a 54,000-lb gvwt rating, has an 18,000-lb front axle and rear tandem axles rated at 36,000 lb. This truck is designed to meet load requirements that permit 49,000-lb gvwt on a three-axle truck, but where weight on rear axles is limited to 32,000 lb. To provide extra flotation for off-highway use, the two front wheels are equipped with 14.00-20 tires. Rear tires are 10.00-20. Available with either a conventional or tilt-type cab, the C6-547 is powered by a 212-hp gasoline engine. The other new truck, the model C6-405, is designed to carry maximum legal loads in areas where weight is limited to 44,000 lb with 32,000-lb loads on the rear axles. This truck will scale legally with 5 to 5½-yd loads in its 5-yd mixer. The truck has a gvwt rating of 44,000 lb, with 12,000 lb on the front axle. Standard tires are 9.00-20. Power is supplied by a six-cylinder, 175-hp gasoline engine. Both new trucks are six-wheel-drive units with five-speed transmissions and two-speed transfer cases. — **Four Wheel Drive Auto Co., Clintonville, Wis.**

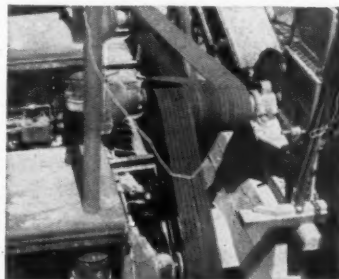
continued on page 131

Thermoid Hose is built to take a beating !



Two wagon jacks with DB-30-WD pneumatic drills, equipped with Thermoid Hose, digging sewer trenches near Buffalo, New York.

Make Thermoid your choice too, for Multi-V Belts ...



... and Conveyor Belting



Thermoid "Thunderbird" Hose has the built-in brute strength to take pounding punishment day-after-day ... to give you longer wear, fewer replacements. *You can forget about down-time.*

"Thunderbird" Hose is just one of the Thermoid products designed to help you get the most profit out of your investment in construction equipment. Your local Thermoid Distributor can recommend the Thermoid Hose, Multi-V Belt or Conveyor Belting designed to do a specific job best.



Thermoid Company
Trenton, New Jersey
Nephi, Utah

NEW DESIGNS IN CATERPILLAR EQUIPMENT AND PARTS DEPEND ON CREATIVE USE OF HIGHEST QUALITY STEEL

Example: Track hardware, made of stronger pre-tested steel and "Hi-Electro" hardened, stays tight without lock washers, often lasts through two sets of shoes

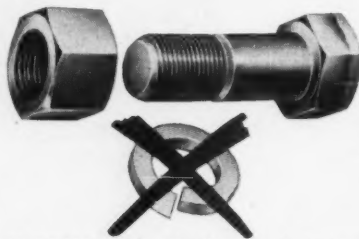
How much does it cost to pull a tractor off a job to tighten or replace track hardware? It costs plenty, in down time and in service time. That's why Caterpillar's new track hardware is such a good investment.

Caterpillar hardware normally stays tight without the use of lock washers throughout the service life of the first set of track shoes. And, exclusive "Hi-Electro" hardening of dome-shaped bolt heads often permits bolts to be used for a second set of shoes.

Most track hardware looks pretty much alike, but there's a big difference in quality. Steel, for instance. All steel for Caterpillar's new track bolts has a minimum tensile strength of 151,000 pounds per square inch, well above the SAE standard of 120,000-140,000.

The special steel accepted for track hardware is furnace-heated,

quenched and tempered to toughen the entire bolt against breaking,



ELIMINATION of lock washer is feature of Caterpillar's new track hardware.

bending and the permanent stretching that leads to loosening of the nut.

Carbon, lost from the surface area in mill rolling and heat treating, is re-

stored by Caterpillar with a carefully controlled, carbon-atmosphere process. Then threads are "rolled" into the bolt, curving the natural flow lines to follow the thread contours, producing threads that are highly resistant to stripping.

The large dome-shaped head receives an exclusive deep and even "Hi-Electro" hardening. This protects the hexagonal corners from mushrooming. Wrenches fit onto Cat bolts after many hundreds of hours of hard use.

This same quality of material, design and manufacture is found in all Caterpillar parts. And they're always available at your Caterpillar Dealer. See him today.

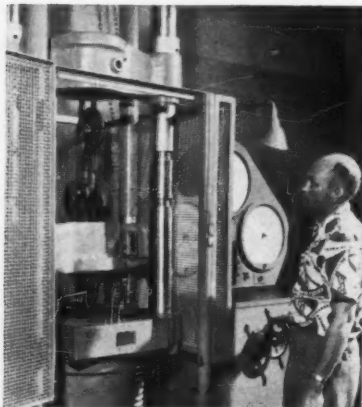
Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

SERVICE TIP

A torque wrench should always be used to tighten track hardware to factory-recommended torque values. Your Operating and Maintenance Instructions give exact values for each tractor model.



TENSILE STRENGTH of a bolt is tested in Caterpillar Laboratories. Each bolt is capable of supporting the full weight of the tractor for which it is designed.



DON KOPP, Master Mechanic, McCann & Co., Inc., Springfield, Ill.: "We're real boosters of genuine Cat parts, especially track parts. Other brands just don't last as long. When you buy Cat parts you know they are going to fit, last longer and give the best service because they are built to do the job by the people who built the machines."

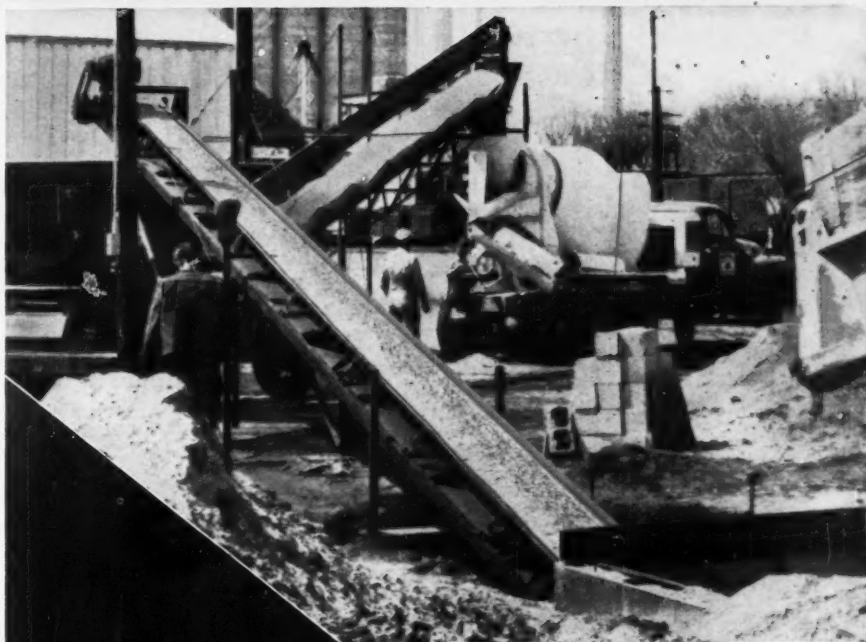
Lubricated for Life

The Caterpillar D9 tractor is now equipped with lifetime-lubricated track rollers, carrier rollers, and idlers. Floating ring seals with metal-to-metal sealing surfaces make possible the development, which the company calls "a significant forward step" in cutting track maintenance requirements. The new track equipment has been introduced after 2½ yr of extensive field tests on all types of jobs. These tests prove that the new rollers and idlers effectively seal out dirt, hold in lubricant, rotate easily, and wear longer, according to Caterpillar engineers. The floating ring seals use special alloy metals. Oil is added to rollers and idlers at the factory. Until it is time to rebuild the parts, no other lubrication is necessary. Each seal consists of only four parts. A resilient synthetic rubber ring supports one piece of the two-piece metal face seal that mounts on the cast iron outer bushing of the roller or idler. Both the rubber ring and one part of the metal seal rotate with the roller or idler rim. A second rubber ring is mounted in the end collar and does not rotate. This ring suspends the other half of the metal face seal. The seal's contact surfaces are so closely fitted that dirt cannot enter and oil cannot escape. Sealing characteristics are not affected by wear. The metal seals can be reused when rebuilding rollers or idlers. Other new improvements include hardened shafts with increased diameters for greater beam strength; end collars that are locked in place with snap rings for ease of assembly; and lengthened bronze bushings in track rollers and idlers that increase load carrying capacities. Also new is a steel track roller hub that replaces the former cast iron types.—Caterpillar Tractor Co., Peoria, Ill.

Bucket Choice for Loader

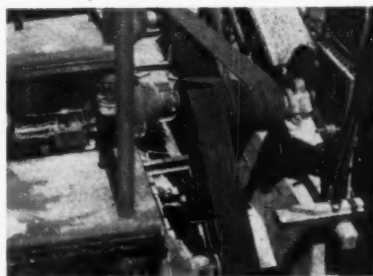
Yale & Towne's new four-wheel-drive Trojan tractor-shovel is available with a choice of three interchangeable bucket sizes—a 1½-yd general utility bucket, a 1¼-yd heavy material bucket, and a 2-yd light duty bucket. The new member of the Trojan line is powered by either a GM diesel

Thermoid Belting is "built to take it" at the rate of 175 tons an hour



The McShane "BATCH-A-MATIC" is equipped with Thermoid Conveyor Belting.

Cut costs with
Thermoid Multi-V Belts...



... and Thermoid Hose



The belting used on the McShane "BATCH-A-MATIC" takes severe abrasion and hard use. In the space of two minutes, it has to charge a truck with 3 cubic feet of aggregate, plus 21 cubic feet of cement... or stockpile aggregate at 175 tons an hour.

T. S. McShane Co., Omaha, makers of the "BATCH-A-MATIC" equips every machine with Thermoid Belting. To quote Mr. R. Milek, McShane's chief engineer: "Thermoid engineers recommended this belting after studying our needs. This assures every customer long, trouble-free belt life without costly downtime."

Your distributor working with Thermoid engineers can recommend the right belt for your needs.

Thermoid

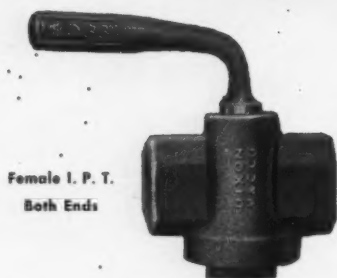
Thermoid Company
Trenton, New Jersey • Nephi, Utah

*Avoid One Cause
of Air Line Leaks
and Pressure Loss*

"BOSS"

Self-Honing

AIR VALVES



Built to withstand the hard knocks of mining and construction service, "BOSS" Valves are also ideal for general use on pipe lines, hose lines, compressor tanks, etc., and for the handling of water. They do not require packing.

Bronze plug firmly seated by spring tension against harder metal of valve body is automatically honed to perfect seat as handle is turned. A straight, full-flow opening extends through valve body and plug, providing greater capacity with no friction loss. Valve opens or closes by a quarter turn of the handle.

INTERNALLY ATTACHED HANDLE—In sizes $\frac{3}{8}$ " to $1\frac{1}{2}$ " valve stem and handle are combined in a strong one-piece forged steel unit which is anchored to the bronze plug within the valve body. This patented feature eliminates stem and handle breakage. Sizes $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ ", 1 " and 2 " have externally riveted handles.



Male I. P. T. Both Ends

Stocked by Manufacturers and Distributors
of Industrial Rubber Products

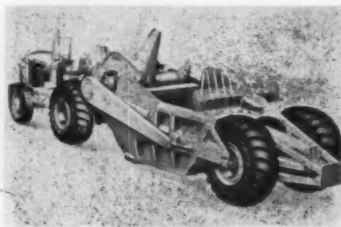
DIXON
Valve & Coupling Co.

GENERAL OFFICES & FACTORY—PHILADELPHIA 22, PA.
BRANCHES—CHICAGO • BIRMINGHAM • LOS ANGELES • HOUSTON
DIXON VALVE & COUPLING CO., LTD., TORONTO Associate Companies
Buckley Company, Inc., Garyville, Pa. • Precision Draw Steel Company, Canton, N.Y.

EQUIPMENT NEWS... continued



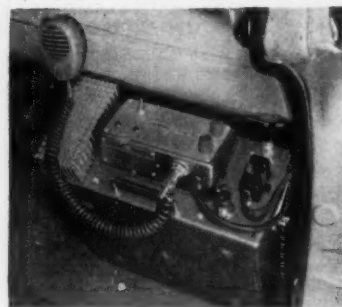
or Hercules gasoline or diesel engine. A planetary torque converter with a 3.5:1 torque ratio is standard equipment. Axle differentials allow power to be transferred from a wheel that is not achieving full traction to the opposite wheel. Travel speed of the new tractor-shovel ranges from 3 to 21 mph in third, both forward and reverse. Shifting into any forward or reverse speed is done at full throttle without stopping. Hydraulic power steering is standard. The model 124 has a dumping clearance of 8 $\frac{1}{3}$ ft under the bucket cutting edge. Maximum lifting capacity is 10,000 lb.—Trojan Div., Yale & Towne Mfg. Co., Batavia, N.Y.



Scraper For DW20

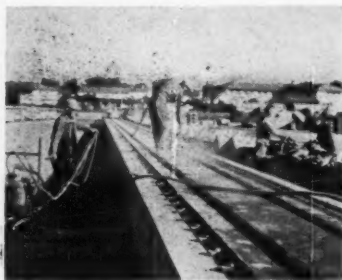
A new 24-yd struck-capacity scraper called the No. 482 Series B is now available from Caterpillar. The new unit joins the 18-yd No. 456 scraper to give machine users a choice of scraper sizes for the Caterpillar DW20 wheel tractor. The bigger No. 482 is said to operate most economically when loading conditions are good, haul roads at a minimum, and rolling resistance low. One feature of the new unit is the location of the bowl lift sheaves in the draft frame spreader tube. The bowl lift cables are attached directly to the bowl sides—a design that gives maximum protection from dust and keeps bowl lift sheaves and cables from fouling. Other features include sealed sheave bearings, an oversize cable saver that cuts down on ad-

justments, and a bowl latch that prevents the bowl from dropping if the cable breaks.—Caterpillar Tractor Co., Peoria, Ill.



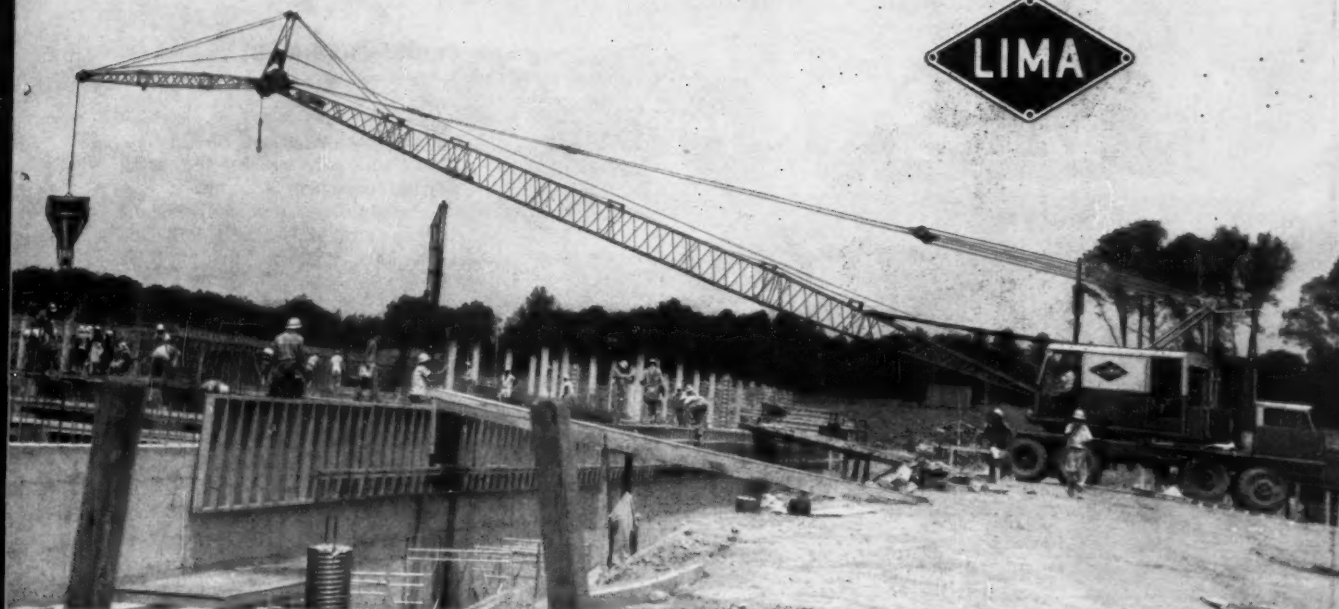
Power Pack Cuts Size

New two-way radio equipment introduced by General Electric incorporates transistor power for both transmitter and receiver. Units are available either for mounting in the front of a car or pickup truck (pictured) or in a vehicle's trunk. The transistors cut down on the size of the units and make installation easier. General Electric transistor-powered units are available for low band frequencies (25-54 mc), high band frequencies (144-174 mc), or for UHF (450-470 mc).—General Electric Communication Products Dept., Electronics Park, Syracuse, N.Y.



For Prestressed Concrete

A new lubricant for prestressed concrete beam and pipe beds has been introduced by Shell. Called Shell form compound, the release agent permits quick stripping of concrete members, leaves concrete clean, and does not build up on forms. The compound is a water-emulsion material that is mixed just before it is used at the ratio of one part compound to five parts water. The emulsion costs about 20 cents per gal. Three gal-



New LIMA 64-T Truck Crane with 100' boom and 30' jib reaches out almost horizontally to pour concrete on foundation job.

New LIMA 64-T Truck Crane combines high capacity, long reach, low weight



LIMA 64-T . . . new 50-ton truck crane.

The 64-T Truck Crane with 50 ton rated capacity is the latest addition to the long line of dependable, high performance LIMA cranes. The 64-T is completely designed and built, from the ground up, by LIMA. The latest developments in high strength steels are utilized to combine high capacity and long reach, with low weight. The main frame and components of the 64-T carrier is of "T-1" steel (100,000 psi yield strength).

Goes anywhere truck can go

Mounted on 12 heavy duty tires, the LIMA-designed 8 x 4 (rear drive) or 8 x 6 (front and rear drive) carrier will go anywhere a truck can go, on-or-off highway, at speeds up to 25 mph.

The LIMA Type 64-T Truck Crane will raise a 150-ft. boom, plus 30-ft. jib (180'-0" total), from the ground without auxiliary aid.

Gantry can be lowered to cab height while

boom is suspended. Rear counterweight, pin connected front and rear outrigger boxes and beams are easily removed to reduce road weight. Hydraulic power steering, precision air controls and air brakes insure easy operation to reduce operator fatigue and produce top performance.

Versatile LIMA Cranes

LIMA cranes—capacities to 110 tons crawler mounted and 70 tons rubber mounted—are highly versatile. Interchangeable front ends make them adaptable to almost every job; they can be used as cranes, shovels, draglines or pullshovels.

Learn now why LIMAS are the choice everywhere for rugged, dependable performance! See your nearby LIMA distributor or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA Construction Equipment Division, Lima, Ohio
BALDWIN • LIMA • HAMILTON

Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment

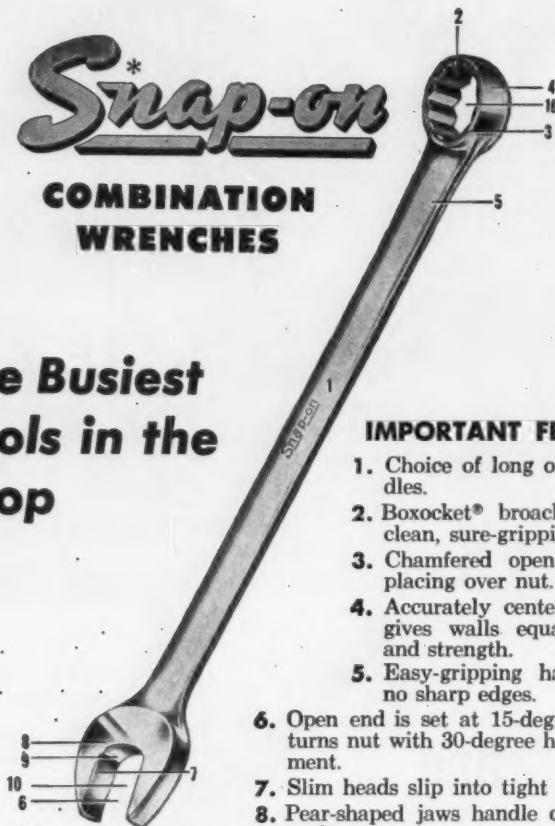


5839

Snap-on

COMBINATION WRENCHES

The Busiest Tools in the Shop



IMPORTANT FEATURES

1. Choice of long or short handles.
2. Boxsocket® broached to give clean, sure-gripping walls.
3. Chamfered opening aids in placing over nut.
4. Accurately centered opening gives walls equal thickness and strength.
5. Easy-gripping handles have no sharp edges.
6. Open end is set at 15-degree angle — turns nut with 30-degree handle movement.
7. Slim heads slip into tight spots.
8. Pear-shaped jaws handle close-quarter work.
9. Opening has rounded bottom — helps prevent breakage.
10. Same size opening at both ends.

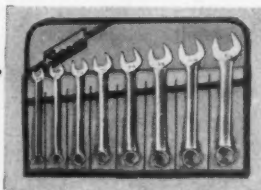
3 POPULAR SETS • OTHER SETS AND EXTRA LARGE

SINGLE WRENCHES AVAILABLE

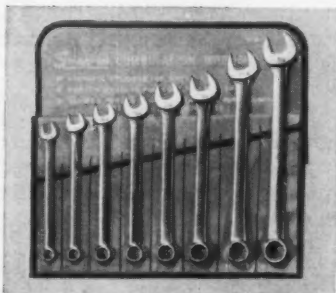


◀ **Angled-clearance offset** — 6-wrench set from 5/16 to 5/8-in. openings. Also individually.

▶ **Close-quarter short handle** — 8-wrench set from 5/16 to 3/4-in. openings. Also individually.



◀ **High-leverage, long handle** — 8-wrench set — sizes from 7/16 to 7/8-in. openings. Also 12, 15 and 18-wrench sets or individually.



Snap-on branches and warehouses are located in key industrial centers throughout the U.S. and Canada.

SNAP-ON TOOLS

C O R P O R A T I O N

8042-L 28th Avenue • Kenosha, Wisconsin

EQUIPMENT NEWS... continued

lons will cover a 420-ft double-tee bed, according to Shell. The compound can be applied with normal spraying equipment and it sets almost on contact without staining forms. — **Shell Oil Co.**, 50 W. 50th St., New York 20, N.Y.



Capacity Rating Increased

Struck capacity of the LeTourneau-Westinghouse BT Fullpak scraper has been increased from 18 to 21 yd. Heaped capacity is now 27 yd. The BT Fullpak, largest tractor-drawn scraper in the LeTourneau-Westinghouse line, can be used with tractors of 150 hp or more. The increase in capacity rating was accomplished with only minor changes, according to the company. The bowl still features a clean design that minimizes friction and loading resistance. The flat position of the bowl floor during loading—it has only a 1-deg tilt—allows material to slide back into the bowl easily. — **LeTourneau-Westinghouse Co.**, Dept. 085, Peoria, Ill.



Reo Adds Trucks

Two new truck series, the C-200 and the C-300, have been added to the Reo line. Both series offer five base models with a variety of body types. GVW ratings are from 18,500 to 23,000 lb, and rear axle capacities range from 15,000 to 17,000 lb. Chassis features include Ross steering systems; extra long front springs; and optional single or double-reduction or two-speed axles. Five six-cylinder gasoline engine with a variety of speed and power ratings are available. — **Reo Div., White Motor Co.**, Lansing, Mich.

225,000 cu yd of Sandstone Gets the "Old Heave-ho" at Sutton Dam

Boring most of the blast holes with Bethlehem Hollow Drill Steel, they recently moved 225,000 cu yd of abrasive sandstone at the site of Sutton Dam, Sutton, W. Va. The Bethlehem Hollow, fitted with both multi-use and carbide-insert bits, put in holes up to 15 ft deep.

Sutton Dam is being built under the direction of the U. S. Army Corps of Engineers, Huntington District. Primarily a flood control dam, it will also regulate the flow in the Elk River, for Charleston's water supply system. Upon completion in 1959, the concrete gravity structure will be 1178 ft long, and 250 ft high.

Bethlehem Hollow is Economical

You can take on any kind of rock and drill it economically with Bethlehem Hollow. It's rolled from a grade of steel that's outstanding for its fatigue resistance. The center hole is true and smooth. And with its wide quenching range, it's easy to heat-treat for the proper balance of toughness and wear-resistance. You'll get both durable threads and shanks.

Bethlehem Hollow comes in Carbon and Ultra-Alloy grades in rounds, hexagons, and quarter-octagons, and is regularly furnished in standard lengths of from 18 to 27 ft. Longer lengths can also be supplied. Be sure to specify Bethlehem Hollow for your next rock removal project.

Bethlehem Hollow Drill Steel bores blast holes up to 15 ft deep at site of Sutton Dam on Elk River at Sutton, W. Va. Contractors: Arundel-Dixon-Hunkin Joint Venture—The Arundel Corp., The Hunkin-Conkey Construction Co., and L. E. Dixon Co.

BETHLEHEM STEEL COMPANY BETHLEHEM, PA.

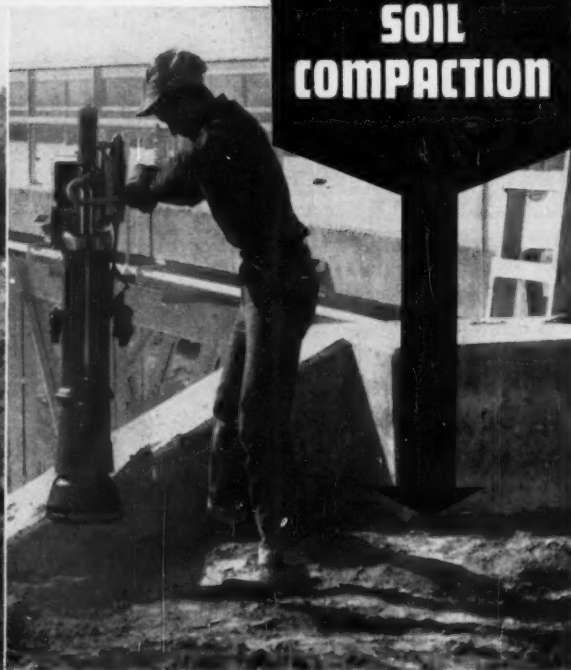
On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
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BETHLEHEM STEEL



Where SPECIFICATIONS call for . . .



BARCO RAMMERS are THE ANSWER!

YOU can't get *high degree* SOIL COMPACTION by "patting it" or "shaking it." For deep, penetrating force to produce 95%, 97.5%, or even 100% compaction, Barco Rammers are THE ANSWER. For many soil conditions, they are the only answer.

THE KEY TO BETTER CONSTRUCTION—High degree soil compaction is worth every cent it costs. Barco Rammers are especially effective for compacting fill in restricted areas—close to walls, culverts, abutments, around footings, and in trenches—on all kinds of construction jobs: Toll Roads, Freeways, and Highways; Air and Missile Bases, Hydroelectric Power and Flood Control Dams, Bridges, Buildings, and Housing Developments.

ONE MAN OPERATION—On area tamping, one man can average 20 to 30 cubic yards of fill per hour. On 18" trench backfill, using lifts up to 24", the rate is 360 to 600 feet per hour.

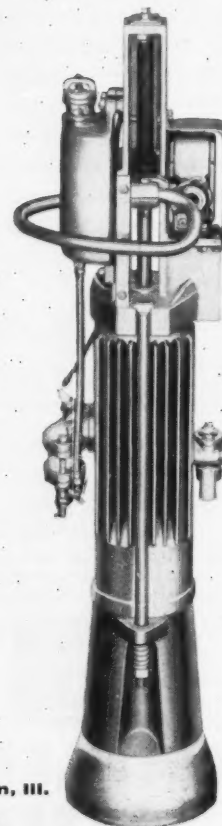
ASK FOR A DEMONSTRATION—We will be glad to arrange a demonstration for you; see our nearest distributor or write. **SEND FOR A COPY OF CATALOG 621.**

Sold and Serviced by the Nation's Leading Distributors

BARCO MANUFACTURING CO.
BARCO RAMMER
for High Degree Soil Compaction



512N North Hough St., Barrington, Ill.
BARCO VIBRA-TAMP
for Granular Fill and Bituminous Surfacing



New Publications

These catalogs and bulletins from manufacturers contain useful information about construction equipment and materials. To obtain a copy, write directly to the manufacturer at the address given.

CATERPILLAR TRACTORS—A new folder describes the Caterpillar DW21 (Series D) and DW20 (Series F) wheel tractors. The brochure deals primarily with two features of these machines—the Super Turbo Engine and the Torsionflex Seat. Also included is information on the No. 456 and No. 470 Lowbowl scrapers and how they are matched to the new wheel tractors. Form 33058.—Advertising Division, Caterpillar Tractor Co., Peoria, Ill.

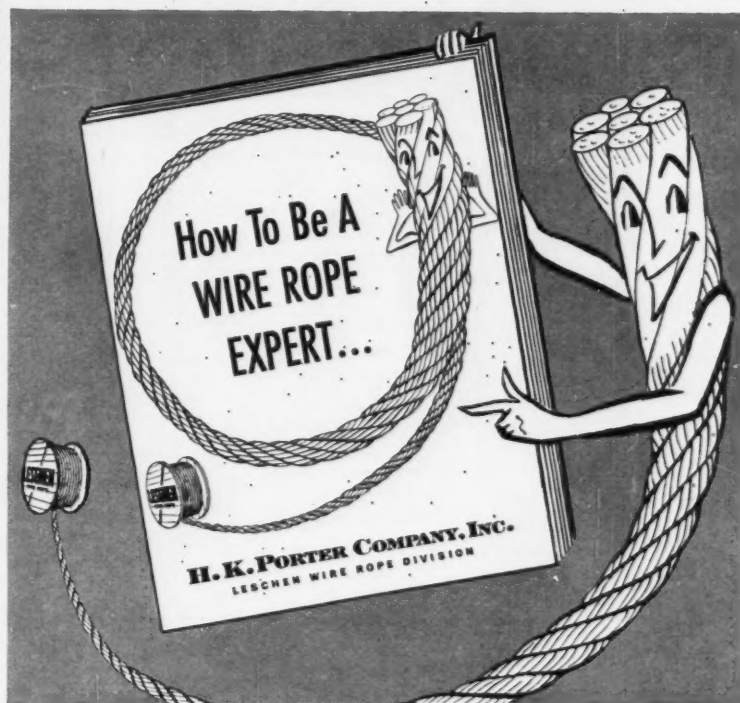
TRUCK CRANE—A 12-p catalog describes the Lorain 107, a truck-mounted crane of 7 and 8 ton capacity. The "107" is a superstructure that is available for mounting on commercial carriers.—The Thew Shovel Co., Lorain, Ohio.

DRILLING TOOLS—A 24-p catalog, No. 358, contains illustrations and specifications for Brunner and Lay carbide drill bits, drills rods, as well as air tool accessories such asmoil points, clay spades, asphalt cutters, etc. Included are suggestions for making carbide drill bits do more work and last longer, plus instructions for sharpening and hardeningmoil points and digging chisels.—Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill.

ALUMINUM STRUCTURE—A 6-p brochure describes an aluminum strut dome building, designed for use as a temporary enclosure. According to the manufacturer it provides shelter for \$1.50 per sq ft and can be erected in 8 man hours. The dome is 57 ft in dia and 16 ft high.—Capitol Products, Mechanicsburg, Pa.

PORTABLE BINS—A sales folder describing a new line of portable bin units has just been released by Pioneer Engineering. The unit is intended to increase plant output by eliminating starts and stops while waiting for trucks to pull up to the plant. The basic unit stores 6 cu yd of material with extensions available to in-

know wire rope... send now for free 16-page guide



Yours for the asking... Illustrated 16-page book of pointers on how to select the right wire rope for any job!

Knowing how to select the best wire rope for the job not only helps reduce costs, but it may also help you to get that job done more efficiently. You'll find the facts you need to know in the book shown above. It has been specifically edited and illustrated for easy understanding by non-technical readers. It describes the forces that tend to destroy wire rope and then, step by step, shows how to determine which wire rope construction will provide the greatest possible resistance to the destructive forces you have found most troublesome. It's an interesting and helpful aid that every wire rope user ought to have. Send for free copy today. Write H. K. Porter Company, Inc., Leschen Wire Rope Division, 2727 Hamilton Ave., St. Louis 12, Missouri.



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LESCHEN WIRE ROPE DIVISION

The 42 LB.

GRIPHOIST

TIRFOR

**LIFTS • PULLS
LOWERS
3300 LBS.
Single Line
6 TONS
OR MORE**

with pulley blocks

Unlimited cable travel
... Portable ... Hand
Operated

Standard equipment
with refineries, engi-
neering contractors,
mines, pile drivers, rail-
ways, electricians, tele-
phone and utility cos.,
steel erectors, plumbers,
sawmills, all rigging.

One Year Written Guarantee

East of Mississippi
Princeton Griphoist, Inc.
32 George Street
Boston 19, Mass.

West of Mississippi
Griphoist, Inc.
424 Bryant Street
San Francisco 7, Calif.

1/2" wire rope

3,300
LBS.



NEW PUBLICATIONS ...

continued

crease capacity to 10 yd.—**Pioneer Engineering, Division of Poor & Co., Inc., 3200 Como Ave., Minneapolis 14, Minn.**

REAR DUMP—A 4-p bulletin describes the new 22-ton, variable wheel base, Euclid-Easton S-12 rear dump. The trailer, built by Easton, is designed for a Euclid tractor.—**Form 1-A8. Easton Car & Construction Co., Easton, Pa.**

REO TRUCKS—A 28-p catalog describes all the trucks, tractors, and bus chassis in the Reo line. It indicates weight classifications, general applications, and major components available. Included is a description of Reo's replaceable wet-sleeve cylinder construction, as well as the low cost rebuild kits for these engines.—**Reo Division, The White Motor Company, Public Relations Office, Lansing, Mich.**

TUNNEL LINER PLATES — A 20-p bulletin, No. 300-C1, on steel tunnel liner plates, gives the properties of the plates, information on how to specify them, general purpose load tables, and tables giving suggested thickness of liner plates for use in tunnels under railroads and highways.—**Howard S. Thompson, Asst. Vice President, Commercial Shearing & Stamping Co., Youngstown, O.**

SHEET PILING—A new catalog, entitled "Steel Sheeting for Trenches, Cofferdams, Cutoff Walls and Shore Protection," discusses two types of sheeting, driving, salvage, and reuse. Also included is a method of figuring size and spacing of wales and struts.—**Form SH-4658, Product Information Service, Armco Drainage & Metal Products, Inc., Middletown, Ohio.**

CABLE SLINGS—For the first time, Macwhyte cable-laid and rope-laid Safe-Guard slings are completely catalogued. These slings are designed for applications where a soft sling body is required and where flexibility is more important than resistance to abrasion. Sling bulletin No. 5886 gives specifications, load ratings, and standard fittings for sizes 1/4-in. dia to 1 1/2-in. dia.—**Public Relations Department, Macwhyte Wire Rope Co., Kenosha, Wis.**

continued on page 140



MAYO Tunnel Cars

... feature practical designs and rugged construction. All cars can be equipped with Mayo's safe, automatic couplers.

- Side Dump Car (shown) has 2 1/2 cu. yd. capacity. 24" gage.
- Rocker Dump Car Ideal for sticky muck or wet concrete. 1 cu. yd. capacity. 24" gage.
- Tunnel Car. Box body is removable and may be hoisted to surface to be dumped into truck. 1/2 to 2 cu. yd. capacity. 18" or 24" gage.

FREE Bulletin No. 18 shows car details;
No. 21 illustrates Automatic Coupler.



MAYO
TUNNEL AND MINE
EQUIPMENT
LANCASTER, PENNA.

Here's how you can MERCHANDISE YOUR ADVERTISING

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Keep your sales, management and distribution people informed on your advertising. Circulate pre-prints, reprints, schedules and other material in these folders, and make your advertising dollars work over and over for you.

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and price list

Company Promotion Dept. ... Room 2710
McGraw-Hill Publishing Co., Inc.
330 West 42nd Street, New York 36, N. Y.



What happened when our backhoe punctured the underground gasoline tank

(Based on Company File #356LP2226)

It seemed a simple enough job installing a 4,000-gallon gasoline tank at a local service station. But during the digging our backhoe knocked two holes in an existing tank.

After pumping the gas out and plugging the holes we notified our Hartford Agent that we had a Liability insurance loss on our hands. We thought the tank would have to be replaced.

Our agent called for a Hartford engineer to look over the situation. When the engineer arrived, we turned the problem over to him. Through previous experience, he was well qualified to handle conditions as unusual as this.

He pointed out that the damage could be repaired by welding the tank, but that protective measures would be needed to guard against an explosion of gasoline fumes. To accomplish this he suggested that water be run into the tank to the level of the lower hole, and the remaining space filled with carbon dioxide. This procedure made it pretty much a routine welding job, and we completed the repairs safely.

Through the engineer's help, we saved a couple days' time, and the claim against us was held to minimum cost — an important factor in keeping our insurance rate down.

Here is an example of the advantages of being insured in the Hartford. When unusual situations arise, the Hartford has the facilities and the men to meet them . . . the desire and the ability to give policyholders fast, competent help.

The Hartford maintains more than 200 Claim Offices and 64 Engineering Department Offices strategically located from coast to coast. Trained personnel are ready to go into action at a moment's notice. To make sure you get the Hartford extras on your insurance and bond needs, call your Hartford Group Agent or your insurance broker.

Year in and year out you'll do well with the

HARTFORD
Fire Insurance Company
GROUP



Hartford Fire Insurance Company
Hartford Accident and Indemnity Company
Hartford Live Stock Insurance Company
Citizens Insurance Company of New Jersey, Hartford 15, Connecticut
New York Underwriters Insurance Company, New York 38, New York
Northwestern Fire and Marine Insurance Company
Twin City Fire Insurance Company, Minneapolis 2, Minnesota

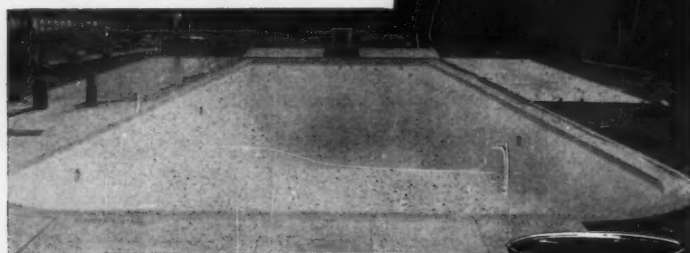
Keep water IN— Keep maintenance DOWN!

Don't take chances with that costly swimming pool.

If it is made of concrete, it is porous—if it is porous, thousands of gallons of water will enter and finally deteriorate the masonry—causing it to crack.



**Make the FIRST COST
the LAST COST!**



Ask your contractor to make sure it is watertight by using THOROSEAL to seal the surface. THOROSEAL is available in many attractive colors.

**Thoroseal is not
just a coating for
masonry, it is a
filling sealer that
becomes a part of the masonry and
protects it from deterioration.**

"How to do it" GET OUR 16
PAGE BROCHURE



STANDARD DRY WALL PRODUCTS, INC.
NEW EAGLE, PENNA. CENTERVILLE, IND.



NEW PUBLICATIONS... continued

WELDING SYMBOLS—The first major change in welding symbols in recent years is announced by the American Welding Society. The new standard contains many additions and improvements. The number of symbols has been doubled because of the increased use of welding and the development of new processes. The new symbols are contained in a booklet selling for \$3, and two sizes of charts—a \$1.50 wall chart and a 50¢ desk chart.—**Department T, American Welding Society, 33 West 39th St., New York 18, N. Y.**

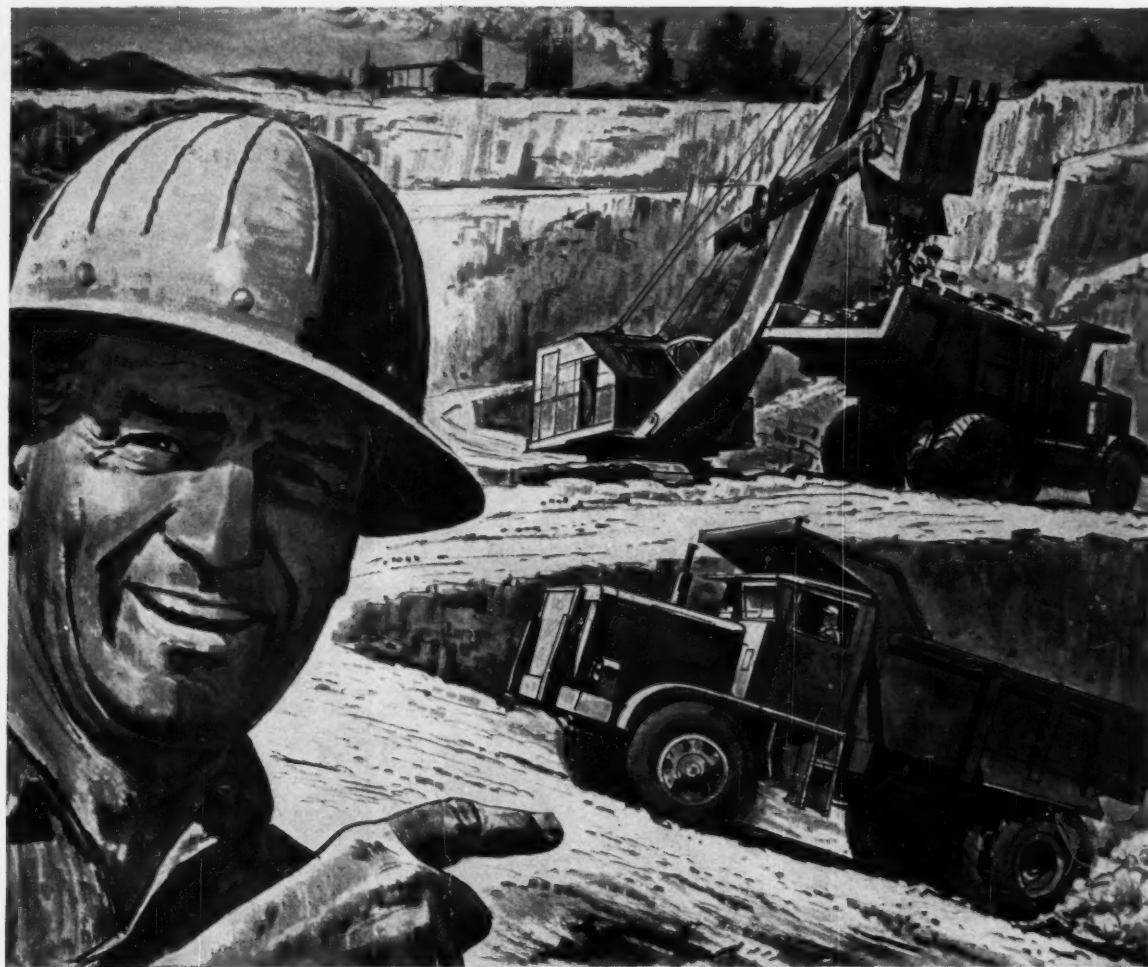
BELT MAINTENANCE—A 12-p illustrated manual, "How to Get Longer Life from V Belt Drives," has been issued by B. F. Goodrich. The manual tells how to select and install V belts, how to detect trouble, diagnose belt failures, and correct drive troubles.—**Public Relations Department, B. F. Goodrich Co., Akron, Ohio.**

FILTER KIT—Fram Corp. has put together a sales kit describing a new line of industrial filter equipment. The kit includes actual samples plus the following four booklets: a 20-p Industrial Catalog; a 16-p General Products Catalog; a 36-p Air Filter Catalog; and a 76-p Filter Specification Catalog.—**Fram Corp., Providence 16, Rhode Island.**

CONCRETE PROCESSING — A new 20-p catalog, form 580, covers the complete Stow line of concrete equipment. Included are details of vibrators, rotary trowels, grinders, and vibrating screeds, as well as complete directions for building your own pre-stressed screed beam.—**Stow Mfg. Co., 31 Shear St., Binghamton, N. Y.**

SALT SPREADER—A new patented salt and cinder spreader, which will be on the market this fall, is described in an illustrated specification sheet.—**Voich Brothers, Irwin, Pa.**

SNAP-ON TOOLS—A complete industrial tool catalog is offered by the Snap-on Tools Corp. It includes power-driven nut runners and impact wrenches, and a complete range of automotive and shop equipment for truck fleets.—**Snap-On Tools Corp., 8028-28th Ave., Kenosha, Wis.**



“Nothing speeds up round trips like **TORQMATIC DRIVE**”

Check with a job superintendent when he's checking his contract's timetable and he'll show you the big difference TORQMATIC DRIVES make on a job.

He'll show you, for instance, that trucks equipped with TORQMATIC DRIVE move 50%, 100% or even more payload per shift than stick-shift trucks.

He'll tell you that TORQMATIC's uninterrupted power flow means faster going upgrade . . . that its built-in hydraulic retarder means safer going downgrade . . . that it helps trucks wade through hub-deep mire or grasping sand that bring regular trucks to a crawl or a stall.

And when he gets down to maintenance and repairs, he'll show you really sensational equipment availability records.

It all adds up to faster contract completion, bigger profits per contract . . . the kind of records and cash you'd like to ring up.

If you're thinking about buying equipment, think about getting it with TORQMATIC DRIVE. It's available in almost any type of construction equipment you can name—or use. See your equipment dealer or write:

Allison Division of General Motors, Indianapolis 6, Indiana.

Allison 

TORQMATIC® DRIVES

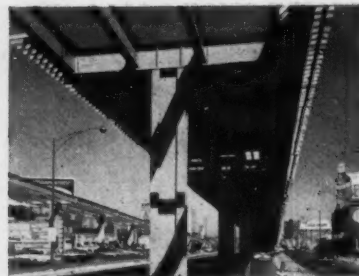
THE MODERN DRIVE FOR MODERN EQUIPMENT



Vallejo, Calif. Interchange



Chicago-Calumet Skyway



Chicago-Calumet Skyway



Illinois Toll Highway



Illinois Toll Highway



Illinois Toll Highway



Chicago-Calumet Skyway



Chicago-Calumet Skyway



Chicago-Calumet Skyway

SUPERIOR ACCESSORIES For Bridge Abutments, Approaches, Grade Separations, Interchanges, and Decks

Various types of Superior Accessories provided money-saving forming in the bridges and related jobs pictured above. With the increasingly keen competition for this type of work, contractors have discovered that the efficient forming methods of SUPERIOR Accessories offer all-important bidding advantages. Some of these accessories are shown below.

Photo Credits—Calif. Div. of Highways, Peter Kiewit Sons, McCammon-Wunderlich; Illinois Toll Highway Comm.; Kenny Const. Co., J. M. Corbett Co.

Whenever you are planning form work . . . Superior's experienced engineering service is available to prepare form layouts, estimates and quotations. This comprehensive service is offered without charge.

Write for NEW 6-PAGE BULLETIN describing the Superior items for use in form work in the general field of bridges, both structural steel and prestressed concrete.

	HEAVY-DUTY SCREED SUPPORTS			SCREED CHAIRS		
					PLATE HANGER FRAME	PRESCON HANGER
						
CONE-FAST COIL TIE				NUT WASHER ASSEMBLY		
SUPERIOR Concrete Accessories, Inc.					NEW YORK OFFICE	PACIFIC COAST PLANT
9301 King Street, Franklin Park, Illinois					1775 Broadway N. Y. 19, N. Y.	2100 Williams St. San Leandro, Calif.

The Maintenance Shop...

Daily Tire Checks Keep Then Rolling

KEEPING rubber-tired rigs on the go over rough terrain in a remote area where normal service facilities are all but inaccessible is a big and important job.

Especially if the project is the size of the \$108-million Glen Canyon dam, which will be the world's third biggest. Merritt-Chapman & Scott, the contractor, has gone a long way toward solving the problem of tire maintenance on this job by enlisting the services of a crew of on-the-job experts.

Headquarters for a crew of B. F. Goodrich tire specialists is a 6,000-sq-ft warehouse located near Merritt-Chapman & Scott's main field office. Here, a stock of the 47 different types and sizes of tires used on the job is kept on hand to service the contractor's machines. In addition, a stock of spares already mounted on wheels is ready for delivery at a moment's notice to meet emergencies.

At least one tire specialist is on the job and available for call 24 hr. a day. The crew handles calls from as far as 40 mi away "with the dispatch of a big city fire department," according to one maintenance supervisor.

But the big story is not the emergencies the tire crew handles. It's the day-to-day inspection system that has all but eliminated unexpected tire failures. Under the direction of Goodrich's G. J. Smith, three tire experts inspect every tire on the project at least once every week. And tires on big earthmoving equipment are checked twice every day.

"That's the reason we have very few surprise failures," says Smith. "The inspection schedule we maintain keeps our men so well acquainted with the condition of every tire on the job that they replace or repair worn or damaged tires before they become a source of serious trouble."

Every tire in service at Glen Canyon has its own case history card. Every month the service records are reviewed by the Goodrich crew. These individual tire records then are forwarded

to Merritt-Chapman & Scott. If a tire has been removed from service during the month, the reason for its failure is listed for the contractor's inspection.

Because the deep canyon can be crossed only on foot over a 1,200-ft suspension bridge, Goodrich keeps at least one man and one service truck on each side of the site. All service vehicles are equipped with air compressors and power tools for handling tire repairs in the field. The large service truck that works from the warehouse has a hydraulic hoist for handling big off-the-road tires.

Goodrich also has recently opened a large new tire retreading plant near Phoenix, Ariz. This plant serves other Goodrich customers, but special large size tire molds are installed to give fast retreading service to Merritt-Chapman & Scott's Glen Canyon project.

The Glen Canyon job has posed a serious challenge to the rubber-tired vehicles that are hauling millions of tons of rock, aggregate, and other materials. Merritt-Chapman & Scott's inspection and service program is going a long way toward meeting this challenge.



STITCH IN TIME—At Oahe, Goodrich tire expert changes tire on International Payhauler before it causes trouble. Service truck carries power tools and compressor.

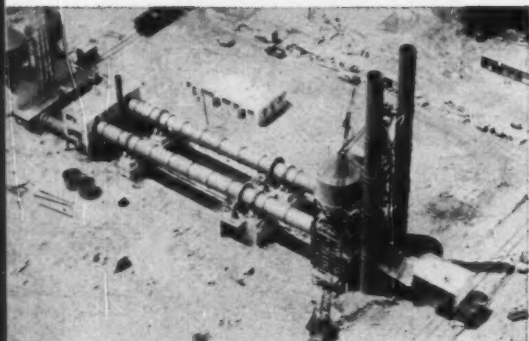


LIFE HISTORY—Tire experts check file cards that list present condition and past history of every tire on the job. Big earthmover tires are inspected twice each day.

How Fruin-Colnon Contracting industry and commerce...

• \$209 million of construction in 5 years

• \$31 million of material purchases



This F-C designed and constructed calcining plant for the General Carbon & Chemical Corp. at Robinson, Illinois, was in large scale operation just 12 months after preliminary engineering started. The plant will increase the company's conversion of raw petroleum into pure carbon for electrodes by 720 tons a day.

Completed \$207 million of construction in 5 years

Indicative of the size and scope of Fruin-Colnon's construction operations is its ever-increasing volume of construction of all types. In a five-year period, it has completed \$207 million of construction. This includes building and industrial construction and heavy engineering projects. Since its incorporation in 1908, Fruin-Colnon has completed over 4,500 projects; an average of one project every 24 working hours for the last fifty years.

The growth pattern for a five-year period shows: 1953—\$20 million—155 projects, 1954—\$17 million—144 projects, 1955—\$37 million—185 projects, 1956—\$51 million—116 projects, 1957—\$62 million—160 projects.

Fruin-Colnon offers complete construction service.

In addition to general contracting work, Fruin-Colnon offers a complete service of project design, engineering, construction and administration. For over 40 years, many of the nation's big plant installations for many

AS HEAVY construction heads into an estimated boom year of \$52* billion in 1959, contractors will be taking on more contracts and greater work loads. Some contracting firms will be responsible for construction only. Others, like the Fruin-Colnon Contracting Company of St. Louis, Missouri, will handle everything from the design and engineering to the completed project.

It was some 85 years ago that Jeremiah Fruin went into the construction business. In 1895 he was joined by Redmond S. Colnon to form a partnership, and they incorporated in 1908. Through the years, Fruin-Colnon expanded its operations as an engineering and construction company. Today, it maintains corporate and executive offices in St. Louis, Missouri; Indianapolis, Indiana; Burlingame, California and Tehran, Iran.

*U.S. Dept. of Commerce

types of industrial works have been awarded to F-C. Fruin-Colnon's construction service includes 1) site studies, preliminary plans and estimates, plant layout, specifications; 2) construction—field engineering, materials, and supplies, methods and equipment, equipment installations; 3) administration—purchasing and expediting, sub-contracts, supervisors, accounting and pay-rolls, etc.

Owens and operates 1,300 pieces of equipment worth \$4 million

It takes close coordination of the best in manpower, equipment and materials to complete the wide variety of construction projects which Fruin-Colnon handles in the course of a year. Some 1,300 units of every type of equipment is required to handle the tremendous work load of F-C projects. New equipment is being purchased all the time to meet growing needs and normal replacement. Here's F-C's inventory of major equipment:

Fruin-Colnon's Heavy Equipment Inventory

Compressors—(Ingersoll-Rand, Chicago Pneumatic, Gardner-Denver)
Trucks—(Chevrolet, Ford, International Harvester, GMC, Euclid)
Crawler Tractors—(Caterpillar, Euclid)
Tractor Shovels—(Caterpillar)
Scrapers—(Caterpillar, Euclid)
Crawler Cranes—(Bucyrus-Erie, Manitowoc, Northwest)
Truck Cranes—(American, Lima, Bucyrus-Erie, Michigan)
Scrapers, Towed—(Caterpillar, Bucyrus-Erie, GarWood)
Truck Tractors—(Chevrolet, Ford, Mack)
Welders—(Lincoln, Hobart)
Trailers—(Tool and Office)—(Fruehauf, Kingham, Trailmobile)

Low-Boy Trailers—(Fruehauf, Martin)
Flatbed Trailers—(Currell, Baker, Fruehauf)
Bottom Dump Ore Haulers—(Euclid)
Forklift Trucks—(Clark, Ross, Towmotor)
Sheepsfoot Rollers—(Bros, Chester, Tamco, Grace)
Road Patrols—(Caterpillar)
Concrete Spreaders—(Blaw-Knox)
Rock Spreader—(Jersey)
Road Rollers—(Bros, Galien)
Compactors—(Tamco)
Aggregate Bins—(Blaw-Knox)
Cement Plants—(Butler)
Concrete Buckets—(Gar-Bro, Blaw-Knox)
Locomotive—(Whiting)
Conveyors—(Mulkey, Johnson)

Backhoes—(Bucyrus-Erie)
Shovels—(Northwest)
Concrete Finishing Machines—(Blaw-Knox, Jaeger)
Floodlight Generators—(Onan, Kohler)
Excavating Buckets—(Owen, Hendrix, Kiesler, Erie)
Finegraders—(Buckeye)
Pavers, Dual Drum—(Koehring)
Scaffold Panels—(Beaver-Advance, Ezebilt)
Road Forms—(Blaw-Knox, Heltzel)
Pile Hammers—(Vulcan)
Pile Leads
Pumps—(Carver, Nova, Marlow)
Pavement Breaker—(Ottawa)
Turntable—(Freeman)

Company serves

... with diversified equipment • 2,000 men

Over \$1½ million of new equipment purchased in a year

The continuous and significant increase in Fruin-Colnon's annual construction volume requires a corresponding increase in equipment purchases. The increased number of projects in diversified locations throughout the nation and abroad has required larger amounts of different types of equipment. In 1957, Fruin-Colnon purchased \$1½ million of equipment to complete just one project. In 1958, an additional \$500,000 was spent for new equipment in the first 9 months.

\$30 million of materials purchased in a year

The significance of purchasing in contracting operations, cannot be overemphasized. A contractor's profit depends heavily on this important operation. In a single year, for example, Fruin-Colnon purchased \$30 million of materials for a wide variety of construction projects. These included large purchases of cement, lumber, steel, pipe, glass, copper products, aluminum, builders' hardware, insulating materials, windows, etc. Estimates of materials requirements are furnished by Fruin-Colnon in advance of construction... and F-C assumes responsibility for all details of purchases.

Top personnel characterize Fruin-Colnon

The success which Fruin-Colnon has achieved is a direct tribute to the men who direct its operations, from the president and his staff to the skilled equipment operators. Fruin-Colnon's permanently employed key personnel totals about 350. This includes 26 project managers, 51 engineers, and 41 superintendents. Nearly half of the permanent staff has been employed for more than ten years. The non-permanent work force totals from 1300 to 1700 men.

Why key men in Fruin-Colnon read CONSTRUCTION METHODS magazine

As construction volume continues to increase, contractors who are expanding the size and scope of their operations must be aware of the many advances and developments in the industry. That's why top management and other key personnel in Fruin-Colnon subscribe to CONSTRUCTION METHODS magazine... the contractor's magazine.

President J. P. Soult of Fruin-Colnon has this to say about CONSTRUCTION METHODS:

"I have been a reader of CONSTRUCTION METHODS for many years. It enables me to keep aware of the developments in techniques and other important phases of the contracting business, and has been a valuable help in Fruin-Colnon's contracting operations. It has long been must reading for our key personnel."

Heavy Division Manager O. A. Ray says...

"I have been reading CONSTRUCTION METHODS for some 20 years. Its coverage of new techniques, methods and equipment has been of special interest. The picture technique used by CONSTRUCTION METHODS provides a quick understanding of what's being discussed. Articles on contracting operations which may have application for us are saved for reference. New equipment is of special interest... and the ads in CM&E are a help in keeping me up to date with new equipment and its use."

In all, there are 46 Fruin-Colnon personnel who subscribe to CONSTRUCTION METHODS. These include the president, vice presidents, project managers, superintendents, engineers, and others with responsibility to specify and buy.

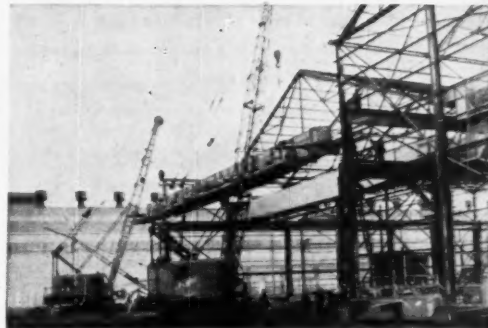
Consistent advertising in CONSTRUCTION METHODS magazine is the most direct route to important contracting firms like Fruin-Colnon. Your sales messages regularly reach 46,900 key men in construction including 13,250 contracting firms both large and small, through the ad pages of CONSTRUCTION METHODS.



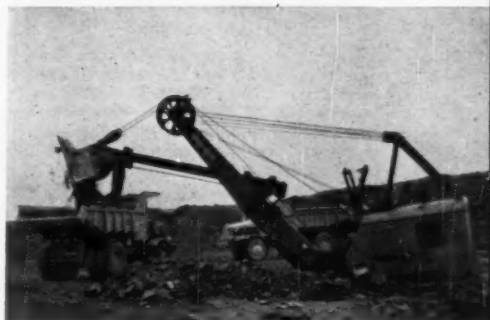
John P. Soult, President of Fruin-Colnon Contracting Company, a Construction Methods magazine subscriber for many years. 18 years in all types of industrial and commercial construction. Member ASCE, ASPE, ASMU, Moles, and Past President, A.G.C. of St. Louis.



Oliver A. Ray, Vice President and Heavy Division Manager, Fruin-Colnon. 21 years of construction experience in all types of industrial and commercial. A subscriber to CONSTRUCTION METHODS magazine for 20 years. Member ASCE and St. Louis Engineers' Club.



\$2.4 million project. Reinforced concrete foundations and machine bases were placed for the 182,000 sq. ft. Granite City Steel Co. finishing building. Raising of crane girder for a 75-ton overhead crane for the Temper Building is pictured here.



\$3 million project—plant grading site. Required over 4 million cu. yds. of dirt excavation and ½ million cu. yds. of rock; clearing 350 acres of wooded area and rerouting a river. \$1.5 million of new equipment was bought to complete project.

**Construction
Methods** AND
EQUIPMENT

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Awarded — over \$70 Million a Day!
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Protect your profits with CD's advance warnings of material shortages, price increases, wage rates, etc., etc.

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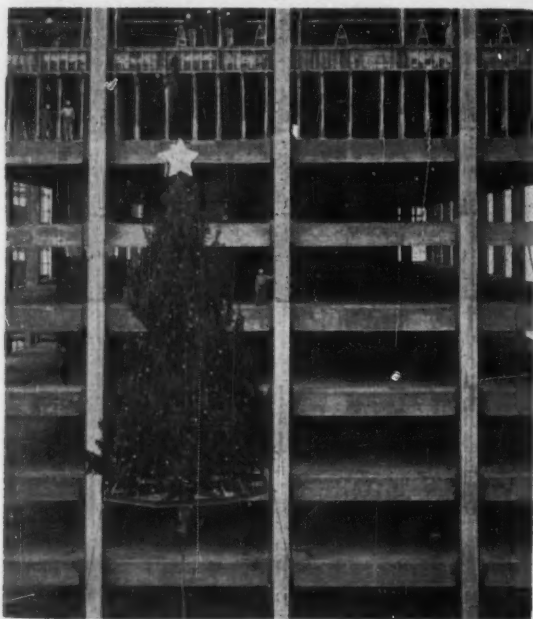
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Methods Memo . . .



Merry Christmas

Contractors on the Time & Life Building in Rockefeller Center extended the season's greetings to New Yorkers by raising a 35-ft Christmas tree with 330 colored lights as they topped out the 48-story building.

The tree, with the star at its tip 630 ft above street level, is a holiday season landmark in the city. It is rigidly braced with I-beams and steel cables to withstand hurricane force winds.

General contractors on the job are George A. Fuller Co. and John Lowery, Inc. Bethlehem Steel Co. fabricated and erected the steel frame.

Happy New Year

1959 will be a busy year for construction men. Construction put in place next year may top \$70 billion for the first time in history.

The Departments of Commerce and Labor forecast a record \$52.3 billion of new construction will be put in place during 1959. That is a 7% increase.

On top of this, there will be about \$18 billion of maintenance and repair work by *Construction Methods* estimates. Altogether the total construction market next year should amount to more than \$70 billion, a new high and about \$3 billion above this year's total.

The forecast by the Commerce and Labor Departments predicts a 14% rise in public construction and a 4% increase in private work.

All major types of public works, the forecast says, will show gains next year. Much of this, however, will reflect contracts awarded this year. Contract awards this year as reported by *Construction Methods* are 19% above the 1957 level. And *Construc-*

tion Methods predicts that 1959 awards will be about 5% above this year's total.

A jump of 13% in new home construction will account for most of the expected rise in private construction next year, according to the Commerce-Labor forecast.

Six-Month Bridge Job

Here's a record in bridge construction. It took American Bridge Division of U. S. Steel just six months to erect the superstructure for the International High-Level Bridge across the St. Lawrence River at Massena, N. Y.

On May 14, they hung the first piece of superstructure steel. On December 1, the bridge was opened to traffic.

It was a big job. The over-all length of the bridge is 3,480 ft; the suspension span is 1,800 ft long. In addition, there are two suspended side spans each 450 ft long and two approach spans 990 ft and 690 ft long.

Two towers 900 ft apart and 215 ft high provide a navigation channel with a vertical clearance of 130 ft for the St. Lawrence Seaway. American Bridge crews erected these two towers in 21 working days.

On June 30 the bridgemen began installation of the two main cables for the suspended sections of the bridge; on July 12, the cables were formed.

Erection of the suspended spans started on July 22 and was completed on August 12. And the major cable wrapping work was finished on November 14, six months after the first steel went into place.

Altogether American Bridge men put up 3,420 tons of structural steel and 454 tons of steel wire rope to make the bridge.

A. B. Drilling, who came to the job after finishing the Mackinac Bridge in Michigan, was construction superintendent for American Bridge Division.

An Important Start

Florida's construction industry has started something that may have far-reaching importance for builders in all parts of the U. S. It is an organization to conduct building research in an effort to improve building design, materials, and methods.

The Florida Foundation for the Advancement of Building is the only organization of its kind in the U. S. It grew out of discussions among representatives of the Associated General Contractors, the Florida Lumber and Millwork Association, the Department of Building Construction of the University of Florida, and the Florida Association of Architects.

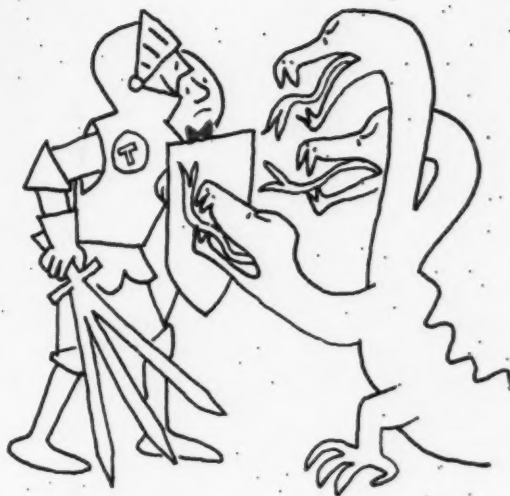
The foundation, a non-profit organization whose officers serve without compensation, is seeking the active participation of everyone in the building field. Contributions by members may range from \$10 to \$2,000. All funds will go for research.

Frank J. Rooney, former national president of AGC, is president of the foundation.



1.

Renowned throughout the building world for his uncanny bids,
Old Andy Schmitt ran out of luck—his business hit the skids.
Pined Andy, "Accidents, slow bonds, down-time—O triple trouble!
Except for them I'd be on top—that threesome burst my bubble."



2.

A man from Travelers sallied in. Said he, "I Will Not Sleep
Until this trio's conquered and you're back atop the heap!
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Our bond men know the local laws—you get just what you need."



3.

"Down-time? Our Builders Risk Insurance and Equipment Floaters
Protect your project and restore those hurt machines and motors.
And Travelers Workmen's Comp and Public Liability
Cuts costs, cuts danger, pays claims *fast*—a wondrous policy."



4.

Tears disappeared from Andy's eyes; he signed the needed papers,
And smiled, "Instead of suicide I feel like cutting capers."
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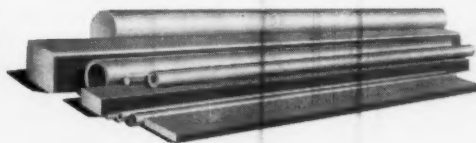
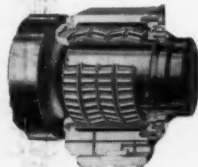
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